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The

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No. 3423. SATURDAY, AUGUST 14, 1926. **Price 1/3**

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QUERIES AND ANSWERS.

PAIN AFTER ARTIFICIAL MENOPAUSE.

"GLENSTRAL" writes: In reply to "D. K. M. D." (July 31st, p. 235), from the data which he gives, I should imagine his patient has suffered from visceroptosis, and consequently some degree of pelvic floor prolapse, since puberty. I would suggest posterior colporrhaphy and ventral fixation of the uterus, as well as the wearing of a Curtis support.

INCOME TAX.

Production of Accounts.

"J. O. R." complied with the request of the local inspector of taxes to send him copies of the accounts of his practice for the past three years; he has since received a request to state the names and addresses of the locumtenents whose remuneration is included in the expenses.

*** Probably the official in question desires the information, not with a view to verifying our correspondent's accounts, but to see that the locumtenents have accounted for any liability there may be on their part. The request is one which can be enforced as regards any locumtenents who may have had other employment in the same financial year. No doubt they have accounted for their own liability, and the request may, we think, be met.

LETTERS, NOTES, ETC.

OPEN AIR FOR COWS.

FORESEEING the difficulties that were coming for arable farming a Berkshire farmer, Mr. A. J. Hosier, resolved to take to grazing and purchased a farm of 1,000 acres on the Wiltshire Downs, where he put into practice certain new principles he had thought out. He determined to specialize in milk production on an all-grass holding, to keep his cows out night and day (winter and summer), to give up mixed husbandry, and to that end to bring such tillage land as there was on the farm under grass. His only crop is hay, and the only additional food he purchases is cake. Every calf is sold. He buys heifers, which are brought into milk at an early age (about 2 years and 9 months), and sold in their prime as cows. The average yield of milk is good—about 720 gallons. The Agricultural Correspondent of the *Times* gives a most optimistic account of the financial results and of the good health of the cows. Perhaps the most novel feature is that instead of bringing in the cows to be milked in sheds a movable milking establishment is taken to them. It is moved about to suit the herds and to ensure equal distribution of manure and the treading of the soil that is so effective in breaking up the matted covering of old grass on the surface. By this plan, moreover, the cost of carting manure is saved. No pails are used and the cows are milked by a machine; provision for the cleaning and sterilizing of the milking apparatus, and the pipes through which the milk passes to the churns, is part of the movable establishment. The cows, enticed by their customary ration of cake, come at stated times into a sort of compound and there they take their turn in the milking stalls. They receive their allowance of cake while the milking machine is drawing the milk from them. They are given 4 lb. of concentrates to a gallon of milk, and in winter at the rate of 14 lb. of hay a day. For ease of feeding the hayricks are built in the middle of the fields. Mr. Hosier attributes the exceptional health of his cows in winter to the altitude of their pastures (up to 870 ft. above the sea), which are above the mists and fogs of the valleys. The farm is now carrying 500 cattle, including 180 cows in milk. The number of cattle could be increased by 100, and probably will be next year. In that case the number of cattle on the farm will be very likely as large as that of the sheep formerly maintained on the same area. The experiment is of great interest to agriculturists, but many of the details essential to follow are not here mentioned. It is also of concern to public health, for it is the last word in cleanliness of milking, and, so far as experience at present goes, in the healthiness of the cows.

CURIOSITIES OF MEDICAL HISTORY.

DR. DAN MCKENZIE is already well known as a graceful writer on non-medical as well as professional themes. His latest contribution is a paper on some curiosities of medical history, read before the Newcastle-on-Tyne and Northern Counties Medical Society last December, which will not tarnish his reputation. In this paper he propounded sixteen questions on medical folk-lore, some of which he discussed in detail. It is interesting to see that in answering the question, "Why ground skull bone cures epilepsy," Dr. McKenzie quotes Paracelsus as saying: "There is a bone in the head called the centrum. If it is drunk it cures the disease. This bone is not more than a kreutzer broad; it is somewhat angular, bifid posteriorly, and is not found in every skull." This bone, according to Dr. McKenzie, is obviously the vomer. Perhaps such an interpretation comes naturally to a rhinologist, but to us it seems rather far-fetched. The average student usually finds the vomer an elusive bone, and we cannot think that it was likely to be chosen as a charm in the days of Paracelsus. Certainly it could not be used as an autogenous medicament. Would not the description apply better to one of the ossa triquetra or wormian bones, whose situation lies open to operation in the living by so-called trephining or scraping? We offer this suggestion to Dr. McKenzie with due diffidence. The editor of a medical journal in the past seems to have treated him badly and exposed his own ignorance when he wrote on the margin of a rejected contribution, "Never heard of such a doctrine," apropos of the doctrine of signatures. We thank God that we are not as other editors may have been, for we discussed the doctrine of signatures in a leading article on August 11th, 1923. One more criticism is suggested by this interesting paper. In discussing what happened to the Assyrian who came down like a wolf on the fold, the meaning of the word *emerod* comes in question. The Oxford Dictionary gives *haemorrhoid* as the modern equivalent, but to make a convincing golden image of a pile, whether internal or external, would seem a task of some difficulty. Dr. McKenzie accepts the suggestion that the emerods were really plague buboes, but it would not be easy to make recognizable images even of these. The origin and purpose of ritual circumcision, the powers of fasting, spittle, and the Hawaiian god of abortion, are some of the other topics treated in this paper. "Quot homines, tot sententiae" might well be expanded into "So many countries, so many beliefs." To spit upon a person is in Europe a contemptuous insult and a breach of good manners, yet in some African tribes it is a mark of friendship and high esteem, for

> "... the world is wondrous large—seven seas from marge to marge—
> And it holds a vast of various kinds of man;
> And the wildest dreams of Kew are the facts of Khatmandhu,
> And the crimes of Clapham chaste in Martaban."

CHILD WELFARE IN THE UNITED STATES.

THE national importance of paying attention to the health of infants and children received further practical recognition in the United States in 1919, when a division of the State Board of Health was created to deal with child hygiene. In 1921, with the passing of the Federal Maternity and Infancy Act, Federal aid became available for those States—forty-four out of forty-nine—which accepted the provisions of what is known as the Sheppard-Towner Act. The issue of the *Medical Woman's Journal* (Cincinnati) for June contains the first instalment of a series of articles on the work in the various States under this Act, which encourages the study of the causes of infantile mortality and the control of the diseases of infancy and childhood. The report of the work in Missouri shows that birth registration has been considerably improved, and that demonstrations and conferences have been arranged in ninety-seven counties of this State, where an appeal is being made for a full-time health service. There has been a decline in the infantile mortality from 82 per 1,000 live births in 1919 to 69 in 1924. In Rhode Island a systematic follow-up of all the infants from birth to 5 years is being organized and pre-natal classes are being extensively held. The *Medical Woman's Journal*, which appears monthly, is devoted primarily to recording the work of medical women throughout the world, and the June issue includes reports on the American Hospital in Paris, and the twelfth annual convention of the Medical Women's Association, including its work in Russia, Greece, Serbia, Japan, and Mexico.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 30, 31, 34, and 35 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 32 and 33.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *112*.

A British Medical Association Lecture

ON

THE MECHANISM OF INHERITANCE.

Given to the Dundee Branch.

BY

F. A. E. CREW, M.D., D.Sc., Ph.D., F.R.S.Ed.,

ANIMAL BREEDING RESEARCH DEPARTMENT, UNIVERSITY OF EDINBURGH.

As the facts concerning inheritance, secured by observation, accumulated, it came to be noted that in them could be recognized an orderliness, an interrelationship. It was then inevitable that the human mind, in its inherent desire to trace and describe order in nature, should seek some mechanism that in its working could account for these facts. So the idea of an "idioplasm" (Nägeli and others), a special substance the function of which was to transmit and control the hereditary characters, details of form and of function, in the developing individual came into being. This idioplasm remained a purely theoretical conception until Wilhelm Roux (1883), out of his work on cell division, was able to point out that many of the functions of this hypothetical substance could be performed efficiently by the nuclear chromatin. Upon this suggestion Weismann (1886, 1894) modelled his theory of the germ-plasm; but inspiring as his hypothesis was, it was constructed at a time when knowledge of the essential organization of the cell was still incomplete and insufficient. Since that time, however, a considerable body of knowledge concerning the cell has emerged from investigations in cytology, microdissection, and tissue culture, and to-day there exists a very clear picture of the living cell which allows the statement to be made with a certain degree of confidence that the chromosomes, because they most nearly satisfy the demands made upon the mechanism of inheritance by the accumulated facts of experimental breeding, are to be regarded as this idioplasm. It can be shown that the only identifiable cell organs that can satisfy these demands are the chromosomes; in their behaviour is realized the precise conditions of hereditary transmission demanded by the results of countless breeding experiments. The theory relating to the functions of the chromatin in inheritance is known as the chromosome theory of heredity.

Of the characters of the living organism known to be hereditary there are two classes—those in which the mode of inheritance has been amply demonstrated, and those as to which sufficient knowledge is as yet not available. Critically controlled experimentation soon demonstrated that the inheritance of characters was not haphazard, but subject to definite rules or laws. It also quickly became apparent that the most striking fact which emerged from a survey of these laws of inheritance was that they applied with equal force to all sorts of living things, that laws established from a study of one organism applied with minor, often readily interpretable, exceptions to all the rest. It can be stated that the principles established by a study of experimentally convenient animals may be applied with success to forms with which, because of various practical difficulties, there has been as yet insufficient experimentation. Man, exceptional in many ways, is essentially similar to those forms of life with which the geneticist has worked; in fact, investigation has already shown that many of his characters—morphological, physiological, psychological—are subject to the universal laws of inheritance. Knowledge of inheritance in the human is essential for accurate diagnosis and prognosis in medicine, and must become the basis for any sound and scientific effort in racial improvement. Problems of human inheritance must be studied by somewhat different methods from those employed in the case of the ordinary experimental stocks. Direct experimentation is impracticable, and the only method now available is that of collecting and analysing sufficient data gleaned from family histories. For examples that clearly illustrate the fundamental orderliness and precision in the transmission of hereditary characters it is desirable to turn to the usual experimental materials of the geneticist. Examples of similar modes of inheritance in the case of human characters are abundant.

It is most convenient to call upon the Dipteran, *Drosophila melanogaster*, the fruit-fly, for illustrations of the different modes of inheritance of characters, for the reason that to its study we owe most of our knowledge of the hereditary mechanism.

(A) If as a parental generation (P_1) a fly with the wild type "long" wings is mated to one with vestigial wings (this character, "vestigial wing form," appeared as a sport or mutation in a long-winged stock) the first filial generation (F_1) are all long-winged. The character "long-winged" is dominant and in relation to it vestigial is recessive. If these F_1 long-winged flies are interbred they will produce a second filial generation (F_2) which includes two classes of flies in respect of wing form—long-winged and vestigial—and in every four on the average there will be three of the former to one of the latter.

(B) If a vestigial-winged fly with the wild-type body coloration grey is mated with a long-winged ebony-coloured fly (the ebony coloration appeared as a mutation in a grey stock) the F_1 flies will all be long-winged greys (grey is dominant to ebony). They will exhibit the two dominant members of the two contrasted pairs of characters. If these F_1 flies are interbred they will produce four classes of offspring in F_2—long-winged greys, long-winged ebonies, vestigial greys, and vestigial ebonies—and in every sixteen, on the average, these four classes will appear in the relative proportions of 9 : 3 : 3 : 1. It is to be noted that the two characters of respective parents, vestigial grey and long-winged ebony, have become dissociated and recombined.

(C) If a long-winged grey F_1 male out of the mating vestigial grey and long-winged ebony is mated with a vestigial ebony female, there will be produced four classes of offspring in equal numbers—long-winged greys, long-winged ebonies, vestigial greys, and vestigial ebonies.

(D) If a vestigial black fly (not ebony, but another mutant character very similar on inspection) is mated with a long-winged grey, all the individuals of the F_1 generation will exhibit the two dominant characters—long-winged and grey. If a male of this generation is mated to a vestigial black female (that is, one exhibiting the two recessive characters), only two classes of offspring will appear—vestigial blacks and long-winged greys—and these will be produced in equal numbers. It will be noticed that the character associations in this generation are exactly those that were exhibited by the two flies with which the experiment started.

(E) If instead of the F_1 male (as in D) an F_1 long-winged grey *female* is mated to a vestigial black male, then four classes of offspring will be produced, not two as in (D), and not in equal numbers as in (C), but in the following relative proportions: long-winged greys 41.5 per cent.; vestigial blacks 41.5; long-winged blacks 8.5; and vestigial greys 8.5. It is to be noted that this result differs from that in (D) in that there is a dissociation and recombination of characters, but only to a certain limited extent.

(F) If a white-eyed male is mated to a (wild type) red-eyed female, all the F_1 males and females alike, will be red-eyed, and if these F_1 individuals are interbred the F_2 will consist of three reds to one white in every four on the average (see A); but all the white-eyed individuals will be males. The recessive character of a grandfather is exhibited by none of his children, by none of his granddaughters, and by only 50 per cent. of his grandsons.

(G) If, on the other hand, a red-eyed male is mated to a white-eyed female, then all the males of F_1 will exhibit the white-eye character of their mother, whereas all the F_1 females will exhibit the red-eye character of their father. There will be criss-cross inheritance, sons "taking after" their mother, daughters after their father.

These are the main modes of inheritance that have to be accommodated by the hereditary mechanism. It is now to be shown how the chromosome mechanism can accommodate them. From a consideration of these facts there can emerge an appreciation of the exact demands that must be made upon the hereditary mechanism. The chromosomes in their architecture and behaviour must be examined in the light of these demands.

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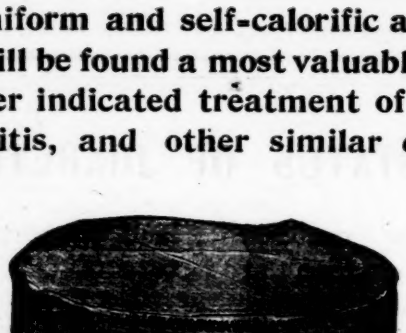

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in their relations to each other are exactly similar to long-winged and vestigial. Grey is dominant, and in the F_2 of a grey by ebony mating there are three greys to each ebony on the average in every four.

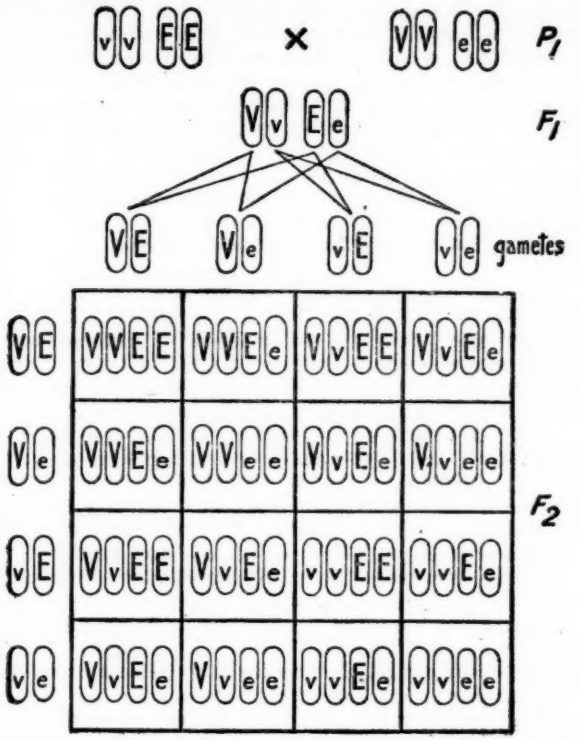

FIG. 4.—The chromosome interpretation of a dihybrid experiment.

Any zygote with the genes—
V and E will be long-winged grey — 9
V but not E will be long-winged ebony — 3
E but not v will be vestigial grey — 3
Without E and V will be vestigial ebony — 1

The results obtained in (C) can be explained just as simply as seen in Fig. 5. The sperms of the male will be

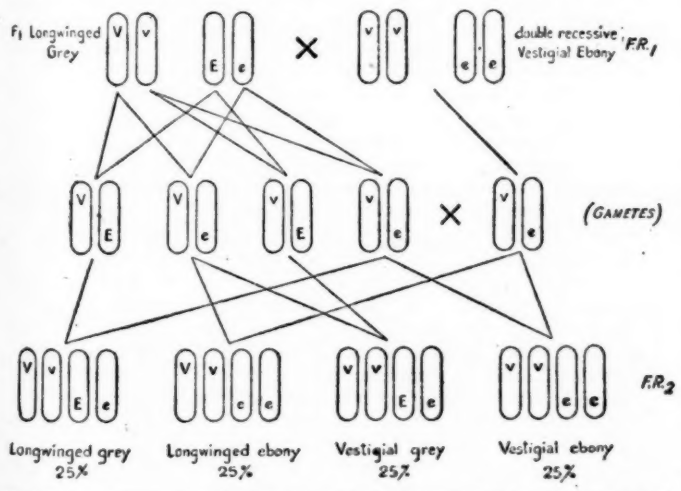

FIG. 5.—The chromosome interpretation of a back cross, showing free assortment.

of four sorts (as above) and they will be produced in equal numbers. All the gametes of the female will be alike in respect of the genes for vestigial and ebony. It follows, then, that since vestigial ebony are recessive characters, the number and proportion of the classes in the resulting generation are predetermined by the number and proportion of the different sorts of sperm elaborated by the male.

VvEe ... Long-winged greys ... ... 25 per cent.
Vvee ... Long-winged ebonies... ... 25 per cent.
vvEe ... Vestigial greys ... ... 25 per cent.
vvee ... Vestigial ebonies ... ... 25 per cent.

It will be recognized that so long as there are as many chromosomes as there are independently heritable characters there is no difficulty in accounting for the mode of their transmission, as will be seen from the following table.

No. of chromosomes in the gamete (the haploid number).	No. of possible combinations of maternal and paternal chromosomes in the zygote.
1	4
2	16
3	64
4	256
5	1,024
6	4,096
7	16,384
8	65,536
9	262,144
10	1,048,576

In the case of the human there are twenty-four chromosomes in the gamete, so that it can be seen that infinite variety in the zygote is possible, even though only one gene were borne on one chromosome.

In *Drosophila* there are many hundreds of characters that can be paired off in the same way as vestigial and long-winged, grey body colour and ebony, yet in each gamete there are four chromosomes to bear their genes. It follows that either the chromosome hypothesis fails to satisfy the demands made upon it, or else more than one gene is resident in one and the same chromosome. If the genes for several different characters are resident in one and the same chromosome, then if that chromosome preserves its integrity during its transference from cell to cell the characters corresponding to the genes resident therein should be transmitted together and should remain *linked* in inheritance.

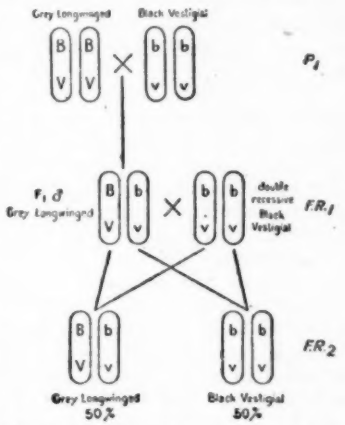

FIG. 6.—The chromosome interpretation of a back cross, showing linkage.

If the genes for black and vestigial are resident in one and the same chromosome, then the results obtained in (D) above can be interpreted. FR_1 is a symbol indicating that an F_1 individual is backcrossed to a recessive. FR_2 represents the resulting generation.

It has been found that all the characters so far examined in *Drosophila* fall into four groups. The members of any one group give this 50 per cent. : 50 per cent. ratio when any pair of them are involved in a breeding test similar to that above; but when any one of them is associated with a member of any other group the result is a 25:25:25:25 ratio, similar to that in the vestigial-ebony experiment described above. There are four linkage groups, and four chromosomes. It is reasonable to argue that upon a particular chromosome are resident the genes of a particular group of characters. More will be said of this conception later.

In (E) it is seen that this 50:50 ratio is not obtained when an F_1 *female* is mated with the double recessive. It will be agreed that the reason for the production of four classes of offspring instead of two must be that the F_1 female elaborated four sorts of eggs instead of two, for the sperm of the double recessive male are all alike, and since the characters vestigial and black are recessive, they will not disguise the results. The classes and the proportion of these can be explained if the F_1 female elaborated the following kinds of eggs in the proportions suggested.

B V	b v	B v	b v
41.5	41.5	8.5	8.5

In order that these four sorts shall be elaborated in these proportions, it is necessary that in the maturation of 17 per cent. of the eggs there shall be an interchange of chromatin between the chromosome B-V and b-v in such a way that the part of the one chromosome carrying the gene B shall be detached from the rest carrying V; that the parts of the other chromosome shall be similarly separated; and

In medical practice the questions that are asked and have to be answered are these: If an individual with a certain characterization marries and has children, will these be normal? How is it that to perfectly normal parents a child with a peculiar characterization is born?

The geneticist is not concerned with the nature of a character, whether it is helpful or harmful; he is concerned solely with the mode of its inheritance. If accurate pedigrees are available, it is usually a simple matter to answer these questions. Most of the human characters so far investigated belong either to type (A) or (F) or (G) above. If it is established that a certain character, such as brachydactyly or diabetes insipidus, is a simple dominant, or that it is sex-linked as in (F) and (G)—for example, haemophilia or colour-blindness—reference to the interpretations given in this paper will enable the practitioner to predict and to explain.

It is to be stated that even yet there exists but little definite knowledge concerning the chemical nature of chromatin; it is known, however, that it is intimately related to the activities of the cell as a whole; that it has a definite architecture and disposition within the nucleus; that it is a semifluid colloid which undergoes gelations and liquefactions of a limited and definite order, and is continuous with the nuclear matrix and thence with the cytosome. It is known that during mitosis the chromatin becomes condensed and homogeneous and then displays most clearly the nature of its organization into units, the chromosomes. It is established that the number, size, form, and behaviour of the chromosomes are constant in a species and are characteristic of that species (Fig. 1). It is known that even when the chromatin is thus condensed in the form of chromosomes it still retains its organic contact with the non-chromatic part of the cell of which it is but a part, though an essential part. It is to be understood that the modern theory of inheritance does not require a special idioplasm concerned solely with hereditary transmission. Reproduction is a function of the cell as a whole, dependent, however, like all its other properties, upon the presence of nuclear chromatin. However, it can be stated that all the evidence there is points to the fact that in the gamete the chromatin alone possesses those attributes of constancy of proportion and behaviour which would appear to be necessary to satisfy the theoretical requirements of an idioplasm. It will be noted that among the bisexual species reproduction is effected by the combined activities of two sexually differentiated parents, each of which contributes to the new individual but a single cell. Yet these gametes, which in their union form the zygote in which the new individual has its being, constitute the only material link between the generations, the narrow bridge across which all the organic inheritance must pass. The fertilized ovum is a new individual, specific to the highest degree, embodying all the possibilities of individual development and racial perpetuation. In certain favourable cases (such as that of *Ascaris megalocephala*, Boveri) it has been possible to trace back in a continuous series to the fertilized ovum in which all the cells of the body have their origin the gametes elaborated by that particular individual. There is a definite cellular continuity through all cell generations.

Fig. 1.—The chromosomes of man. (After Painter.)

There are four pairs of homologous chromosomes in the body cells and immature gametes of *Drosophila melanogaster*, the members of any one pair being identical in size and shape (with the exception about to be stated). In the ripe gamete, egg or sperm, there are four single chromosomes, and because the chromosomes of the different homologous pairs differ one from the other in their size, shape, and relative position, it can be demonstrated that in the ripe gamete there is present one member of each pair, and that in the fertilized egg the diploid (double) number is restored, and that of each reconstructed pair one member has been brought into the zygote by the sperm, the other by the egg. In respect of its chromosomes, the new individual receives from each of its parents one member of each homologous pair.

The chromosome picture differs in the two sexes. In the tissues of the female the members of each pair of chromosomes are identical. In the case of the male tissues one member of one pair is exactly similar in form, size, and disposition to the two members of the corresponding pair in the female, but its mate is unequal, is dissimilar. Since in respect of this pair the sexes differ, these chromosomes in the two sexes are referred to as the sex-chromosomes. The three chromosomes that are alike, two in the female and one in the male, are referred to, for descriptive purposes, as the X-chromosomes; the unequal mate of the X in the male is known as the Y-chromosome. Since of each pair of chromosomes only one can be present in the ripe gamete, then in respect of the sex-chromosomes all eggs must be alike, each containing an X, whereas there will be two sorts of sperm—the X-chromosome-bearing and the Y-chromosome-bearing. If an X-bearing egg is fertilized by an X-bearing sperm, an XX-bearing zygote will result. The male is digametic, the female monogametic in *Drosophila*, as also in man. The XX type of chromosome content is the female. If an X-bearing egg is fertilized by a Y-bearing sperm an XY type of individual will result, and this constitution is typical of the male. Here, then, is a simple and satisfactory self-perpetuating sex-determining mechanism.

Fig. 2.—Conventional diagram of the chromosomes of *Drosophila*. (After Morgan.)

The 3 : 1 ratio in the F_2 of an experiment such as that dealt with in (A) above can be explained if the following assumptions are made. The chromosomes are the idioplasm. In them are resident the agents or factors or genes which in their action determine the future characterization of the individual, controlling the differentiation of the organs and tissues during ontogeny. There is a gene for long-winged and another gene for vestigial, but only one of these can be present at any one time in the particular chromosome that carries them. In each of the chromosomes of a particular pair in the long-winged race there is a gene corresponding to the character long-winged; in the case of the vestigial race there is instead a gene for vestigial. In respect of this same pair of chromosomes the F_1 individual will have received one from each parent; each will carry the factor for long-winged in one chromosome of a pair, the factor for vestigial in the other. Why one gene in its action dominates the other we do not know; the observed fact is that in their relationship to vestigial and long-winged the latter is dominant. When these F_1 individuals elaborate their gametes, into each passes either the chromosome bearing the gene for long-winged or else the chromosomes bearing the gene for vestigial. If there are equal numbers of the two sorts of eggs and equal numbers of the two sorts of sperm, and if fertilization is at random, the following chromosome associations will result, and the four sorts will be equally frequent:—long-winged : long-winged; long-winged : vestigial; vestigial : long-winged; and vestigial : vestigial. Since the character long-winged is dominant to vestigial, there will be on the average in every four three long-winged flies to each vestigial in F_2.

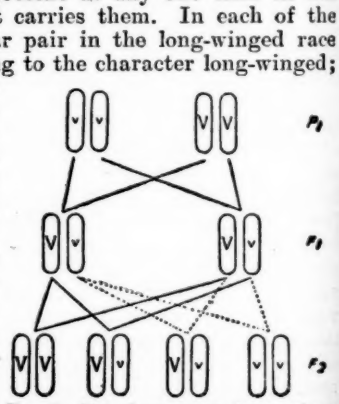

Fig 3.—The chromosome interpretation of a monohybrid experiment.

The 9 : 3 : 3 : 1 ratio in (B) above can be explained if it is assumed that the genes for the body colour characters, grey and ebony, are not resident in the same chromosome pair as are those for vestigial and long-winged (E=the gene for grey; e that for ebony). Grey and ebony

fly is mated with a normal-legged vestigial, and the F_1 male mated to the double recessive female, a 50:50 ratio will be obtained. Dachs is in the same linkage group as vestigial. If the F_1 female is mated with the double recessive, it is found that the C.O.V. between Dachs and vestigial is 34.5 per cent. It can now be stated that the relative positions of Dachs, black, and vestigial are in the order given, black coming between the other two almost exactly midway.

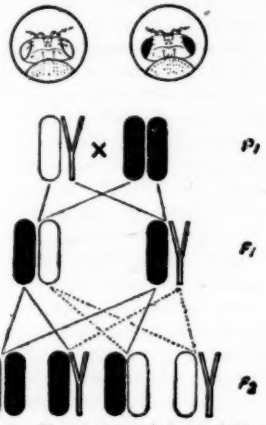

FIG. 9.—Chromosome interpretation of sex-linked inheritance.

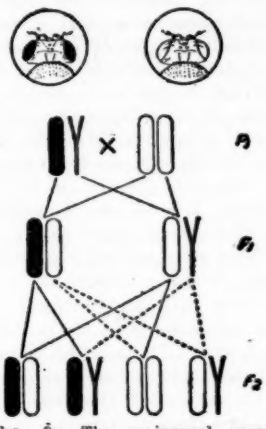

FIG. 9A.—The reciprocal cross giving "criss-cross" inheritance.

One per cent. of crossing-over is taken as the unit for expressing linkage relations. This unit can be represented in a diagrammatic map of the chromosomes as 1 cm. or any other convenient size. A line is drawn to represent a chromosome. A horizontal mark across it is made to represent the position of the gene for black. Seventeen units of distance to one side of it another mark is made for the gene for vestigial, and 17.5 units to the other side of it the mark for the gene for Dachs is made. The making of the map is begun. Some 107 genes require to be placed in this chromosome. Their characters all show linkage with black and vestigial and Dachs, and with each other, and the C.O.V. between any two of them is characteristic. Out of crossing-over work with them it is soon possible to arrange them all in their proper order. In the other linkage groups of *Drosophila* there are 70, 106, and 3 characters respectively. This map gives to the breeder those powers which are possessed by the synthetic chemist in the manipulation of his materials. It can be compared to a railway time-table which shows the sequence of the stations and the distance between them.

All that remains is to show which particular chromosome carries the genes for a certain character linkage group.

A consideration of the facts related in (F) and (G) will lead to the conclusion that the characters red and white eye are being transmitted from generation to generation by some mechanism which is also concerned in the determination of the sex of an individual, and that the simplest interpretation of the facts can be made if it is assumed that the male, in respect of the elements of the sex-determining mechanism, elaborates two sorts of sperm—one, the X-chromosome-bearing, the other the Y-chromosome-bearing. If it is assumed that in the X-chromosome are resident the genes for those characters that in their inheritance behave as does white-eye, being sex-linked, and that in the Y-chromosome there are no genes, the facts can be accommodated. In Diagram 9 the solid chromosome is the X carrying the gene for red-eye, the open one the X carrying the gene for white-eye; XX is a female, XY a male; red is dominant to white.

Other evidence exists which demonstrates that the X-chromosome is concerned in the transmission of the sex-linked characters. It has been shown that when a white-eyed female is mated with a red-eyed male, criss-cross inheritance is observed, the daughters being red-eyed like their father, the sons white-eyed like their mother; and it has been shown further that this type of inheritance can be explained perfectly satisfactorily on the assumption that in the single X-chromosome of the father there is resident the gene for red-eye, and that in each of the X-chromosomes of the mother there is a gene for white-eye, that red is dominant to white, and that the male is digametic, the female monogametic. (Fig. 9A.) It so happened that Bridges found in his stocks exceptions to this rule, and it was not until the chromosome constitution of the individuals concerned was examined that the exceptional cases could be explained.

During the maturation of the egg the two X-chromosomes, like the members of every other pair of homologous chromosomes, disjoin, one passing into the polar body, the other remaining in the ovum. If the X-chromosomes of a white-eyed female failed to disjoin two sorts of egg would result, one containing two X-chromosomes and the other without an X-chromosome. If the XX egg is fertilized by a Y-bearing sperm, an individual with an XXY sex-chromosome constitution would result. This has been shown to be the case, and the individual looks like and functions as a female. If this non-disjunctional XXY white-eyed female is used, instead of the ordinary XX female, exceptional results will ensue.

Bridges was able to explain all his exceptions to the rule of criss-cross inheritance by reference to the sex-chromosome constitutions of the individuals. The exceptional white-eyed daughters are white-eyed because they do not get one of their X-chromosomes from their red-eyed father; the exceptional red-eyed sons are red-eyed because they get their X-chromosome from their father, whereas normally the son gets his Y-chromosome from this source.

It can be accepted that the X-chromosome (chromosome I) bears the genes of the sex-linked group of characters. It can be shown that the small, round, centrally placed chromosome (chromosome IV) carries the genes for another group of linked characters. Individuals with but a single IVth chromosome (Haplo-IVs) and others with three instead of two (Triplo-IVs) have been identified, and these abnormalities in chromosome number are associated with definite abnormalities in general characterization. On chromosome II, one of the larger boomerang-shaped chromosomes, are placed the genes of the characters linked with black; on the other large curved chromosome, chromosome III, those linked with Star.

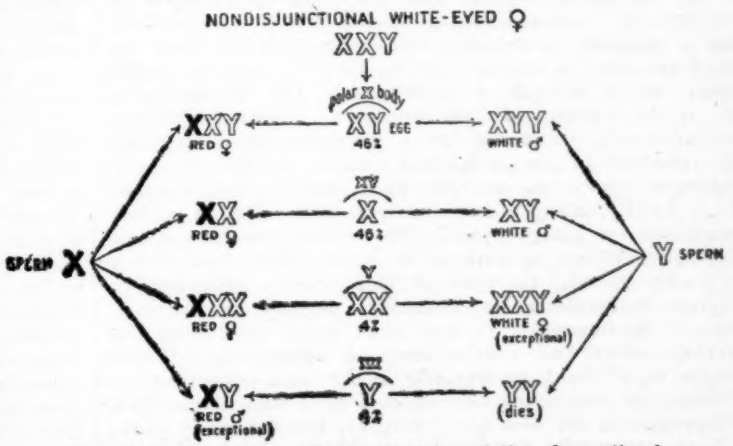

FIG. 10.—Non-disjunction. Chromosome interpretation of exceptional sex-linked results. (After Morgan.)

The story that I have endeavoured to tell is but a brief outline. I have told it because I know of its interest and am convinced of its usefulness. It is desirable, in my opinion, that the medical man should be well acquainted with the principles of the science of genetics, which will give to him a better understanding of his many and varied problems. If I have aroused your interest, I may hope that you will seek further information from the masters at whose feet I am so proud to sit.

For further information consult:

Gates, R. R.: *Heredity and Eugenics*, Constable, London.
Morgan, Sturtevant, Müller, and Bridges: *The Mechanism of Mendelian Heredity*, Henry Holt and Co.
Eugenics Review, London, quarterly.

that these chromosomes shall then reunite in such a way that part of one unites with part of the other, as in D of Fig. 7. It will be noted that interchange leads to

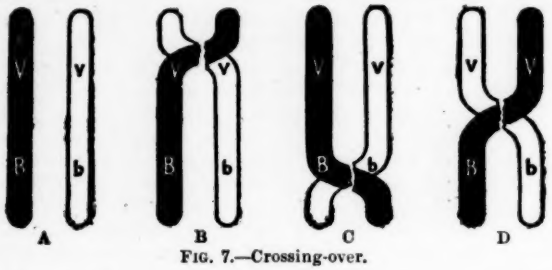

FIG. 7.—Crossing-over.

significant results only when the chromosomes concerned are dissimilar in their genetic constitution. It is in the case of the "heterozygous" female that crossing-over leads to the production of recombination classes. For reasons at present unknown crossing-over does not occur in the case of the digametic sex of *Drosophila*, though it does in other forms.

The two new combinations after the interchange has taken place show again the same linkage relations to each other as did the former associations, showing that the linkage relation is independent of the characters that form the combination. Linkage between black and vestigial is exactly similar to that between grey and vestigial, and between black and long-winged. Such an interchange of chromatin between the two members of a pair of homologous chromosomes is known as crossing-over, and the percentage of the recombination or cross-over classes is referred to as the crossing-over value (C.O.V.), whilst the linkage between two genes is expressed by the percentage of cases in which they remain together. If the linkage in a particular case is 50 per cent. and the C.O.V. 50 per cent., the result would exactly simulate the effects of free assortment giving a 25:25:25:25 per cent. ratio. As a matter of fact, this situation has not arisen in the case of *Drosophila*, being prevented by the occurrence of double crossing-over, fracture and reunion at two points in the chromosome some distance one from the other.

It will have been recognized that this theory of inheritance, like many of its predecessors, postulates the existence of a number of individual particles of substance each of which controls the development of some particular tissue or character in the developing organism. Like the gemmules of Darwin, the biophors of Weismann, the physiological units of Spencer, the pangens of de Vries, the genes of Morgan are required to be minute yet distinct units of, or areas in, the chromatin. It is, therefore, of profound interest to know that the chromosomes are indeed made up of small aggregates, the chromomeres. It has been established in favourable cases that a particular chromosome always exhibits the same series of chromomeres in any stage when they can be identified. Wenrich (1916) in the grasshopper (*Phrynotettix magnus*) has shown that any particular chromosome, to be recognized by its distinctive shape, size, and behaviour, is built up of a definite number of chromomeres, and that these are to be individually recognized by constant differences in form and relative position. The chromosome has a definite and constant organization.

FIG. 8.—Chromomeres in linear series. Conjugating chromosomes of the marsupial *Petauroides*. (After Agar.)

The fact that the chromomeres are arranged in the chromosome in a linear series and that each chromomere has its own particular place or locus in this series is of prime importance in the interpretation of linkage and crossing-over.

During the maturation divisions in the production of the gametes the segregation of homologous chromosomes is complicated by the fact that the members of each pair, prior to their separation, become most intimately intertwined. This apparently single but really double chromosome then splits longitudinally. This conjugation of homologous chromosomes provides the opportunity for crossing-over. It cannot be shown to have occurred, but if during this conjugation the two chromosomes stick, fracture, and rejoin before separation, then interchange of chromatin will have occurred. It is not without significance that conjugation occurs when the chromosomes are drawn out to their greatest attenuation so that the homologous chromomeres derived from the two parents achieve the maximum degree of association in a linear series. It is seen that the equivalent chromosome contributions of the two parents and their random assortment in maturation and chance recombination in fertilization, together with the possibility of an inner reorganization of each chromosome through its most intimate association with another of identical structure but different content, provide an infinite range of new combinations of characters which can be tested out by environmental agencies. The chromosome mechanism can supply the variations upon which the forces of selection can operate. It becomes apparent also that this conjugation of chromosomes in synapsis excludes the possibility of fruitful crosses between species widely different in chromosome constitution.

If the conjugation of homologous chromosomes is accepted as evidence in support of the conception of crossing-over, and if the genes are strung like beads upon a string, each particular gene having its own particular locus upon a particular chromosome, then it follows that the percentage of crossing-over between any two loci can be regarded as an indication of the distance between them. If the members of a pair of homologous chromosomes during their conjugation are as likely to fracture and reunite at one point as at any other point along their length, it follows that the further apart any two genes lie in the chromosome, the greater is the chance of crossing-over occurring; and conversely, the nearer together the genes lie, the smaller is the chance of crossing-over occurring. If this is so, then it is possible to construct a map of the chromosomes, showing the relative positions of the different genes resident in each. If A, B, and C form a linear series, and if B lies between A and C, then the crossing-over percentage occurring between A and C should equal the sum of the C.O.V.'s between A and B, B and C. The conception of the localization of the genes in linear alignment is due to the peculiar differences between the C.O.V. between genes of the same character linkage group. The relation of three or more points to each other is a relation of linear order and cannot be represented in space in any other manner than by a series of points arranged in a line. The linear order of the chromomeres is established beyond question. Linearity is the expression of a system in which there is a fixed succession of elements. The distance between any two elements is constant, but is variable throughout the series. In the case of the more simply organized forms of life it is possible to conceive the idioplasm having the form of a congeries of chromatin units, the members of which can exist separately within the nucleus and become associated by chance. In the more complex forms, however, the precision exhibited in the inheritance of a most complicated characterization demands a very precise and more complex hereditary mechanism, such as is supplied by the chromosomes in their constitution and behaviour.

In order to learn how the chromosome map is made, let us assume, for example, that the character Dachs (short legs) appears as a mutation in a stock of *Drosophila*. Breeding experiments show that it is an hereditary character, for when mated with the wild type it gives a 3:1 ratio in F_2. We then, let us say, mate a black normal-legged individual with the new form, grey Dachs, to get an F_1. The F_1 male is then back-crossed with a double recessive female, and we get a 50:50 ratio. We then know that Dachs belongs to the same linkage group as does black. The F_1 female then back-crossed with a double recessive male gives black normal-legged 41.25, grey Dachs 41.25, black Dachs 8.75, grey normal-legged 8.75 per cent. The C.O.V. between Dachs and black is 17.5 per cent. We already know that the C.O.V. between black and vestigial is 17 per cent. We can, therefore, anticipate that the C.O.V. between Dachs and vestigial will be either 0.5 or 34.5 per cent., the actual figure being decided by the relative positions of the three genes. If a Dachs long-winged

into the musculi recti, through which measure nitrous oxide becomes an important agent in the so-called "combined anaesthesia."

In a similar fashion we may use ethylene, which was developed by Luckhardt. Mixed with 10 to 20 per cent. oxygen it has given a deep narcosis with marked relaxation in 100,000 cases without any bad effects on the patients. Its only disadvantages are its inflammability and explosive character. Acetylene (narcylen), whose anaesthetic qualifications were discovered by Wieland and made practical by Gauss, is equally as efficacious as ethylene. It is now used in many German clinics, as seen from papers written by Eggers, Hurler, Kurtzahn and Teichert, Phillipp, Reis, Schmidt, Solbach, etc. Its greatest disadvantages—namely, its inflammability and explosiveness—can be practically eliminated by caution and use of Gauss's "rebreather." The failure to get complete muscular relaxation can be overcome by local novocain injection.

B. Combined Anaesthesia.

Crile's method of anoci-association is a type of combined anaesthesia in which in every laparotomy the sensory nerves are blocked central to the operative field by injection of novocain and unconsciousness is effected by using nitrous oxide. Combined anaesthesia was recommended as the method of choice by Lennander in 1901, and since then has been adopted by many surgeons (Bakes, Eiselsberg, Goullioud, Hillman and Apperly, Laewen, Wheeler, etc.). Through careful anaesthesia of the peritoneum of the anterior abdominal wall the greater part of the narcotizing agent can be avoided. The theory of Lennander, that manipulation of the mesentery is painless, is no longer accepted. The experimental work of Pannett has proved that the injection of novocain into the mesentery of animals has not only guarded against shock, but also eliminated rigidity of the abdominal musculature. Therefore with combined anaesthesia it is necessary to inject novocain also into the mesentery.

Combined anaesthesia represents a marked progressive step over general, because with its use injury to the parenchymatous organs practically disappears. For this purpose nitrous oxide or narcylen, which are completely satisfactory, may be used. Unfortunately these substances are too expensive to be used in our Austrian hospitals. This necessitates the use of ether as a supplemental agent. Ethyl chloride has also been used as a supplement to local anaesthesia by different surgeons (Braun, Payr). But it is dangerous. Fatalities are reported by Hofmann, Jaeger, Kausch, Renner, etc.

C. Regional (Local) Anaesthesia.

To make extensive laparotomies really painless it is necessary to anaesthetize the peritoneum of the posterior as well as the anterior abdominal wall. In stomach resections for cancer anaesthesia of the abdominal wall alone was sufficient for the painless performance of the operation in exceptional cases only, and when large doses of morphine were given. In the majority of cases ether was required after opening the peritoneal cavity ("combined anaesthesia"). Real painless resections have been possible through the injection of novocain into the mesenteries, as recommended by me in 1912, only in cases when every pull at the mesentery can be avoided. But an absolutely painless operation in every case can only be obtained when the peritoneum on the posterior abdominal wall is anaesthetized. This can be achieved by paravertebral or spinal anaesthesia.

The dangers of regional anaesthesia increase as the spinal canal is approached. Mesenteric anaesthesia is practically harmless, while with spinal anaesthesia one has to deal with the danger of poisoning to the higher brain centres in addition to infection (meningitis). On this account Braun's advice to inject the anaesthetic as far as possible from the spinal canal should be followed. The amount and concentration of the agent used should be in proportion not only to the extent of the operation, but also to the vitality of the patient. The agent generally employed is novocain, of which on the average 200 c.cm. of 1/2 per cent. solution is used. In very cachectic and anaemic patients it is better to use 1/4 per cent., which is also satisfactory. Tutocain has been greatly employed for the last three years in Germany. It is found to be much more effective than novocain, necessitating the use of only 1/5 to 1/8 per cent. solution. As a pre-operative measure the patients receive, one hour before operation, 0.02 gram pantopon, and then, a quarter of an hour before operation, 0.01 to 0.02 gram morphine with 0.00025 to 0.0005 gram atropine. Although scopolamine is used by many surgeons, I have not used it since I saw its use result in a fatality eighteen years ago.

In all cases of regional anaesthesia it is necessary to have a complete anaesthesia of the anterior abdominal wall. In order to obtain this, besides the external injections on the lateral border of the rectus muscle, it is advisable to inject novocain after opening the abdomen from the inside as far laterally as possible into the properitoneal tissue.

1. *Mesenteric Anaesthesia.*

Mesenteric anaesthesia is the simplest and least dangerous method of regional anaesthesia; it is satisfactory in all cases in which all pulling can be avoided. It is entirely satisfactory in cases of resection for a movable ulcer or cancer in ptotic stomach; but when the ulcer penetrates into the pancreas a supporting narcosis is necessary. Mesenteric anaesthesia should be used in every operation begun under general narcosis in order to decrease the operative shock (Pannett).

2. *Paravertebral Anaesthesia.*

Paravertebral anaesthesia is of advantage only in operations in which injection on one side suffices—for example, in colon resection, cholecystectomy, etc. Therefore in 1912 I advised the employment of this method in these cases only. In cases of doubtful diagnosis it is far better to infiltrate the anterior abdominal wall prior to incision, examine the abdomen under short ether or nitrous oxide narcosis, and continue the operation with mesenteric or splanchnic anaesthesia. Up to the present I have used paravertebral anaesthesia in 131 cases, and ether was necessary fourteen times. There were 49 colon resections in this series, and in 45 of these paravertebral anaesthesia was quite sufficient. Paravertebral anaesthesia cannot be adopted in all laparotomies, but will be found of great advantage in exceptional cases, such as resection of the colon, cholecystectomies, etc.

3. *Splanchnic Anaesthesia.*

In upper abdominal surgery, instead of blocking each ramus communicans by paravertebral injection, the united nerve trunks of the splanchnic can be anaesthetized. This can be done posteriorly according to Kappis's method, or anteriorly after opening the peritoneal cavity according to Braun's method. Less commonly used are Farr's and Roussiel's methods, where the splanchnics are blocked by injection of novocain into the hepatico-duodenal fossa and thus into the retroperitoneal space. The technique recommended by Roussiel, in which novocain is injected into the retroperitoneal space near the superior mesenteric artery, is said to anaesthetize not only the small bowel, but also the organs innervated by the splanchnic nerves. This method is not used very much, and only 30 cases are reported by Guttierez. Kappis's method is used in France by Billet and Laborde and by Pauchet, in England by Cade, and Hillman and Apperly. In America Labat introduced Kappis's method, and during my sojourn there in 1923 I saw that it was used almost exclusively. Only Skillern reported in 1922 that he used both the Kappis and Braun technique; and in 1923 Blahd published the fact that he used Braun's method instead of that of Kappis. Since I demonstrated Braun's method it has been adopted by Beck, Burke, and Meyer. In Germany Braun's method is used, and it has recently been adopted by the clinics of Haberer and of Payr.

The Kappis method is a little more risky than Braun's technique because of the danger of intravenous and intraspinal injection. In my book on local anaesthesia in abdominal surgery (translated into English by Burke) I pointed out the possibility of lateral spinal anaesthesia. As a matter of fact, several fatalities caused by the use of Kappis's method are reported in the literature, which

British Medical Association.

PROCEEDINGS OF SECTIONS AT THE ANNUAL MEETING, NOTTINGHAM, 1926.

SECTIONS OF ANAESTHETICS AND SURGERY.

SAMUEL JOHNSTON, M.D., C.M., F.A.C.P., in the chair.

AT the invitation of Sir James Berry, President of the Section of Surgery, Dr. Samuel Johnston, President of the Section of Anaesthetics, took the chair, and, expressing his appreciation, said that for once there could be an association of surgery with anaesthesia without the question of sufficient relaxation arising.

DISCUSSION ON ANAESTHESIA IN ABDOMINAL SURGERY.

OPENING PAPERS.

I.—PROFESSOR H. FINSTERER,

Vienna.

WHEN I received the invitation to read the opening paper on anaesthesia in abdominal surgery at the combined meeting of the Sections of Anaesthetics and Surgery of the British Medical Association I felt highly honoured, but at the same time I had great doubts as to being able to carry out the task, on account of my inadequate knowledge of the English language, and for this I must ask your consideration. In the first place, I beg to tender my warmest thanks to the President, Mr. Hogarth, for the invitation, which I regard as a great honour and distinction, and I beg to thank the secretaries of the Surgical Section for the interest they showed in operations under splanchnic anaesthesia on their visits to Vienna. I think it is due to their influence that this important theme was suggested for this combined session.

In abdominal surgery anaesthesia is of greater importance than in operations on the extremities, for through diseases of the abdominal organs, such as acute appendicitis or cholelithiasis, serious changes in the liver are caused, so that a complete anaesthesia with chloroform or ether, by which the liver is affected, may cause fatal hepatic insufficiency, which in cases of operations on the extremities is not to be feared. If the power of resistance of the peritoneum is weakened by a prolonged deep narcosis, the infection of the abdominal cavity, possible in every abdominal operation, can more easily lead to fatal peritonitis. Finally, many abdominal operations, such as radical operations for gastro-jejunal ulcer, belong to the greatest and most difficult operations, in which death from shock is to be feared. In view of this, every endeavour to improve anaesthesia in abdominal surgery is justified. Since it is impossible in this small paper to discuss the development of all the methods of anaesthesia, I will devote myself more particularly to the most important.

Naturally during my experience I have used all methods of anaesthesia for abdominal surgery, but for many years I have practically employed only the regional and the combined methods. I am so convinced of the advantages of combined and regional anaesthesia over general anaesthesia that I do not now operate on patients who insist upon a general anaesthetic. The methods of anaesthesia can be classified into three groups:

A. *General Anaesthesia.*—The whole operation is completed while the patient is unconscious and the anaesthesia occurs *exclusively* in the cerebrum.

B. *Combined Anaesthesia.*—Pain is eliminated partly as a result of interruption of the sensory nerves and partly through unconsciousness during part of the operation as a result of temporary exclusion of the cerebrum, through general narcosis.

C. *Regional Anaesthesia.*—The conduction of pain is interrupted by injecting effective drugs near the sensory nerves, but consciousness is unaffected. This interruption may be effected (1) in the spinal canal (spinal anaesthesia); (2) near the spinal column (paravertebral, parasacral anaesthesia); or (3) the splanchnic nerves themselves (splanchnic anaesthesia) or their branches in the mesenteries (mesenteric anaesthesia) can be blocked.

A. GENERAL ANAESTHESIA.

Ether and chloroform, alone or mixed, are commonly used to-day. Chloroform is gradually being used less frequently because of its injurious effect upon the parenchymatous organs (liver, heart, kidney).

The advantages of general narcosis are: complete loss of consciousness, which is of great importance in nervous patients; complete muscular relaxation with the associated greater ease in laparotomies; and the ability to examine the entire peritoneal cavity for diagnostic purposes.

The unfavourable features of general anaesthesia are:

1. *Primary danger of the anaesthetic*—death during the narcosis; but in the hands of a trained anaesthetist and with the use of ether this is no longer to be feared.

2. The *drop in blood pressure* which results both from the action of the anaesthetic upon the vasomotor centre and from the injuries to the heart musculature. This fall in blood pressure is of extreme danger inasmuch as the blood pressure, which may be already low as a result of disease (peritonitis or intestinal obstruction), is further decreased as the result of the loss of the intra-abdominal pressure secondary to eventration of some of the intestinal loops.

3. As already shown by Crile, in general narcosis the conduction of pain to the cerebrum is not interrupted, and this fact leads to marked changes in the higher brain centres. These changes (confirmed by Crile) and the increased hydrogen-ion content of the blood (acidosis) are the causes of the so-called "operative shock."

4. *Injuries of the parenchymatous organs.* The narcotizing agent which is absorbed in the blood not only injures the brain, but also the liver, heart, kidney, adrenal, etc. This injury rapidly disappears in healthy organs after the cessation of the narcosis, but in diseased organs this damage may lead to an insufficiency, especially in the heart and liver, which often terminates fatally. This injury of the liver occurs not only with chloroform but also with protracted ether narcosis; similar changes of the heart are shown by König, of the adrenals by Schur and Wiesel. These injuries are proportionate to the depth and duration of the narcosis, which in turn vary with the extent and duration of the operation. Of course, they can be diminished by sparing use of the anaesthetic by a very competent anaesthetist, but not completely eliminated.

5. *Lung complications* are increased with general narcosis. The experimental work of Snel has shown that the normal resistance of the lungs is diminished by protracted narcosis, so that pneumonia more readily occurs either from bacteria already in the alveoli of the lungs or from aspirated sputum. The ultimate outcome depends directly upon the heart, which is itself damaged by the general narcosis.

The injury to these parenchymatous organs can be diminished if less of the anaesthetic be used. This is achieved through the use of morphine or pantopon, which affect the cerebrum. Scopolamine acts as an excellent synergist, but is dangerous. Atropine decreases the secretion of the mucous membranes, and both morphine and atropine should be used together prior to every ether narcosis. The quantity should be proportioned to the strength of the patient.

To eliminate the disadvantages of general narcosis chloroform or ether is substituted by the gas anaesthetics, primarily nitrous oxide, which favourably impressed me in America. When properly used, it is practically without danger (Crile told me personally that he had no fatalities in over 50,000 cases). It does not cause a drop in blood pressure or damage to the brain, liver, etc. (as shown experimentally by Crile), and on this account it has been a marked advancement in the question of general narcosis. Its disadvantages are, that frequently there is not enough relaxation of the abdominal musculature, necessitating the associated use of ether to obtain complete relaxation. This, however, can be obtained more simply and more effectively by the injection of novocain

and a half hours. Although surgery in the true pelvis can be satisfactorily done with deep epidural anaesthesia, it is far better to use the less dangerous parasacral method.

6. *Spinal Anaesthesia.*

With spinal anaesthesia both the rami communicantes and the spinal nerves are blocked. It results in a complete anaesthesia, which includes the abdominal wall. With the patient in the proper position, the anaesthetized field can be made to include the sixth dorsal segment, so that surgery in the upper abdomen is painless. This method is recommended by many surgeons, who emphasize its safety (v. Bloch, Ceccarelli, Chalier, Chauvin, and Moya, Labey, Lane, Morrison, Vaquié, etc.). Morrison states that he uses spinal anaesthesia in 97 per cent. of all his surgery, and always for laparotomies. In the last ten years he has a total of 11,000 cases without fatality. On the other hand, many authors caution against the use of spinal anaesthesia in surgery of the upper abdomen. Fatalities are reported by Chevassu, Featherstone, Hewer, and others. In the last ten years I have not used spinal anaesthesia because of its dangers and disadvantages, but before 1914 I used it only in very exceptional cases. Spinal anaesthesia is recommended by Farr, Skillern, and Southam for emergency surgery—for example, intestinal obstruction and peritonitis—but it is dangerous, because it tends to decrease an already low blood pressure. This further decrease can lead to collapse. In such cases at least pituitrin, which is recommended by Hagedorn for every spinal anaesthesia to diminish the drop in blood pressure, should be given. I consider local anaesthesia of the abdominal wall and mesenteric anaesthesia combined with a little ether, or in cases of stomach resection splanchnic anaesthesia, preferable to spinal anaesthesia.

Indications.

Crile's teachings of anoci-association should be followed in all abdominal surgery; even when operating with general narcosis the sensory nerves should be blocked to decrease the amount of narcotic used and also the shock. With simple operations such as appendectomy an equally good result can be obtained with local anaesthesia as with nitrous oxide or narcylen. But in major operations, particularly in gastrectomy, intestinal resections, or cholecystectomy, the advantages of combined anaesthesia are so marked that it should be used in every case. It may be advisable to use general narcosis at first with extremely nervous young patients to produce temporary unconsciousness while anaesthetizing the abdominal wall and splanchnics. In many cases with complete painlessness a further narcosis is unnecessary, and in all cases the greatest amount of the narcotizing agent is spared. Despite the fact that local anaesthesia is not only difficult but unsatisfactory in very stout patients, it should be used as much as possible, because with combined anaesthesia the amount of narcotic used is diminished, which is of great importance as these patients have fatty hearts.

With old people it is a great advantage to avoid every ether narcosis, as these patients almost always have some chronic respiratory disorder. A combined anaesthesia of nitrous oxide or narcylen may be used with these older patients. Where a deep or long narcosis is contraindicated because of heart trouble, lung disorders, or advanced cachexia, the operation can be done with success under local anaesthesia, thus eliminating operative contraindications. In no case have I as yet refused to operate, and despite the liberal indications have not impaired my total results. I have successfully done large resections under regional anaesthesia on patients who, because of their poor general condition, were refused the smallest operation by surgeons who always use general narcosis. It is significant that my abdominal surgery in very old patients has given almost as good results as in the young. There are 455 patients between 60 and 88 years of age in 3,315 laparotomies. Of these there were 55 post-operative deaths; but as a rule these were hopeless cases from the start, being moribund from gangrene of the entire small intestine, or advanced peritonitis from perforated gall bladder or colon, etc. Beyond this the mortality of the old is not much greater than that of the young. But in these cases it is specially important to prevent as far as possible pneumonia by very careful after-treatment (regular deep breathing, free expectoration, helped by the use of camphor, etc.).

Operative Results.

The fact that patients can be successfully operated on under local anaesthesia in cases in which surgeons have declared it impossible under general narcosis was stated by Gottstein, a pupil of Mikulicz, thirty years ago. The fatalities due to the so-called operative shock which, thirteen years ago, I asserted should be regarded as late anaesthetic deaths, can be decreased either by local or combined anaesthesia, providing haemostasis is exact and little blood is lost during the operation.

Fatalities from lung complications following operations under regional anaesthesia are seldom seen. Pneumonia does occasionally occur in patients with chronic bronchitis who have had operations in the upper abdomen. But the prognosis depends upon the functional capacity of the heart, which is not injured as would be the case with general narcosis. In addition, the diagnosis of pneumonia is made too frequently after laparotomy because the mere presence of râles is used as a basis for this diagnosis. Wheeler has shown that the râles are secondary to acute oedema of the lungs resulting from fixation of the diaphragm, which is a protective measure against pain. I have not had a single fatality from pneumonia in 841 stomach resections for ulcer, 185 intestinal resections, and 259 cholecystectomies. There were 7 pneumonia fatalities in 264 stomach resections for cancer, 4 of which were secondary to combined anaesthesia and 3 occurred after local anaesthesia. It is of significance that in my material there is practically a complete absence of fatalities secondary to acute stomach or intestinal paralysis. Thus there remain those fatalities which result from insufficient asepsis before or during the operation and which naturally terminate fatally both in old and young patients.

Some examples of how the results of the operation may be improved by systematic use of regional anaesthesia may be introduced here. As my work is confined exclusively to private hospitals, in the last ten years I have performed almost every operation under local or combined anaesthesia, as patients objecting to local anaesthesia are not admitted.

The results in gastric resection for ulcer are markedly improved, as no fatalities due to pneumonia and stomach or intestinal paralysis occurred, although in the last ten years I have practically always done a resection even with old people and patients in a risky state for operation. In 841 resections there were 45 fatalities = 5.3 per cent. mortality. Moreover, the rate of mortality in operations for acute gastric haemorrhage was very high (54 resections with 8 deaths), the highest being in cases where the operation was performed several days after the commencement of the acute bleeding (28 resections with 7 deaths), whilst in early operation—that is, twenty-four to forty-eight hours after the onset of actue haemorrhage—the results are much better (26 resections with 1 death). In all other resections for ulcer I have had a mortality of 4.7 per cent. During the war the mortality was unusually high (81 resections with 11 fatalities = 13.5 per cent. mortality), this being due to poor asepsis. Since 1919 it has gone back to 2.7 per cent. in resections for gastric ulcer, and in resections for duodenal ulcer from 8.1 to 2 per cent. The results are also good in radical operations for gastro-jejunal ulcer, in which not only the greater part of the stomach but also the anastomosing loop of the bowel is resected, there being 4 deaths in 68 cases, or a mortality of 5.9 per cent. I wish to emphasize that in my 841 resections for ulcer there were no fatalities from pneumonia although 87 patients were 60 to 78 years of age. This refutes the teachings of Gottstein, who asserted that the danger of lung complications is not diminished with local anaesthesia in comparison with general narcosis.

In radical operations for cancer of the stomach the mortality depends upon the extent of the resection. It is greatest in cases where the cancer has invaded the neighbouring organs, necessitating the resection of part of the pancreas, liver, transverse colon, etc., there being 44 fatalities in 109 resections (41.7 per cent.); whereas in 155 resections of the stomach alone there were 11 fatalities

are only to be explained by intravenous or intraspinal injection. With greater experience intravenous or intraspinal injection can be avoided; then this method is certainly not as dangerous as maintained by many. Kappis has personal experience with over 1,000 cases of splanchnic anaesthesia without any accident.

There is little reported in the literature about Braun's method. My personal inquiry as to the experience gained in the clinics of Braun, of Haberer, and of Payr, and the hospitals of Kirchmayr (Vienna) and Linhard (Graz) resulted in the following statistics. There is a total of 1,566 cases of splanchnic anaesthesia, of which 875 were performed by Braun, 209 by Haberer, 210 by Payr, 91 by Kirchmayr, and 181 by Linhard. In about 5 to 9 per cent. of the cases a short general narcosis with ether or ethyl chloride was necessary, but no accidents happened except in Haberer's clinic, where by mistake 1/2 per cent. instead of 1/5 per cent. tutocain solution was used; but in all these cases there was no fatality (Tschebul). In 807 cases I myself have had only one of poisoning, which was characterized by cramps, coma, and paralysis of the respiratory centres, this being the result of intravenous injection. This accident was caused by the vomiting of the patient, which moved the needle so that a part of the last 10 c.cm. was injected intravenously. This patient was revived by artificial respiration and intravenous use of lobelin. The fall in blood pressure which is reported by many authors with Kappis's method (Hillman and Apperly, Metge) is said in Braun's method not to occur in a higher degree, as shown by Buhre and Bachlechner.

As novocain is a poison, the amount and concentration must be measured according to the patient's strength. Braun uses for his splanchnic anaesthesia 100 c.cm. of 1/2 per cent. novocain or 1/4 per cent. tutocain solution, while I use on an average 70 c.cm. In cases of severe anaemia secondary to acute or chronic gastric haemorrhage, or in cases of advanced cachexia, I have used 1/4 per cent. instead of 1/2 per cent. novocain solution, and have found that 50 c.cm. will give a very satisfactory anaesthesia in most cases. In my opinion it is better in these grave cases to use a weaker solution and add ether when necessary. The ether in small amounts serves as a stimulant. Naturally, as a result of this weaker solution there is an increase in the number of cases in which ether as a supporting anaesthetic is needed.

Occasionally when it is impossible to separate the aorta from the vena cava because of firm adhesions, as in penetrating gastric ulcers, the introduction of the needle becomes either impossible or may puncture the vena cava. Then mesenteric anaesthesia must be used instead of splanchnic, and if necessary a little ether given to mobilize the stomach (combined anaesthesia). Puncture of the vena cava with a thin needle is of no significance except that, once it occurs, further attempts at splanchnic anaesthesia must be forgone, and mesenteric employed. It is very important to avoid intravenous injection and be sure of this prior to the injection of every syringeful. By aspiration I assure myself that the needle point has not penetrated the vein.

My experience consists of 879 cases of splanchnic anaesthesia, of which 72 were done with Kappis's method and 807 after Braun's method. In the latter ether was used 71 times, or in 8.8 per cent., either at the beginning of the operation owing to unusual insistence of the patient, or during the operation because the anaesthesia did not last till the operation was finished. Ether is most frequently needed in cases of gastro-jejunal ulcer where strong adhesions must be separated before the splanchnic anaesthesia can be completed. The amount of ether used for the entire operation is usually very small, being as a rule 20 to 50 c.cm.; only in one case was 150 c.cm. used. These 807 cases of splanchnic anaesthesia can be subdivided as follows:

1. 112 cases of resection of the stomach for cancer, in which ether was needed 5 times.

2. 468 resections of the stomach for ulcer, ether being used 33 times.

3. 63 cases in which the stomach and gastro-intestinal anastomosis loop were resected either for an unhealed ulcer or gastro-jejunal ulcer. ether being used 25 times.

4. 89 cases of cholecystectomy or choledochotomy, ether being used 8 times.

5. 75 cases of gastro-enterostomy, exploratory laparotomy, etc., in which ether was not used.

If the amount of novocain is adjusted exactly to the patient's strength, pallor, restlessness, and air hunger, which are undesirable by-effects, can be avoided. With the use of tutocain vomiting during the operation is seen much less frequently.

Splanchnic anaesthesia is a progressive step over mesenteric anaesthesia, because through its use there is a complete anaesthesia of the peritoneum of the posterior abdominal wall. For this reason I cannot agree with Drüner that splanchnic anaesthesia is superfluous and dangerous and therefore mesenteric anaesthesia alone should be used. It is self-evident that with splanchnic anaesthesia it is impossible to explore the entire abdomen or operate in the lower abdomen, because the lumbar segment is not anaesthetized. For these purposes a short narcosis must be instituted. Meeker of the Mayo Clinic abandoned splanchnic anaesthesia after an experience of 42 cases of splanchnic anaesthesia with Kappis's technique, in which he had 38 per cent. failures, and because of its dangers. This experience is in contradistinction to the favourable results of Kappis in over 1,000 personal cases and to the good results with Braun's method in more than 2,300 cases. Even when a little ether is given in every case of splanchnic anaesthesia, as is done by Hillman and Apperly, sufficient is gained to make this "combined anaesthesia" the method of choice over general narcosis in cases of resection of the stomach.

4. *Parasacral Anaesthesia.*

Braun's parasacral anaesthesia does not suffice for removal of the rectum, because the nerves supplying the mesosigmoid are not blocked off. This can be achieved by injecting the novocain at the base of the mesosigmoid from behind, as I described in 1922. Or it may be done during laparotomy, after opening the peritoneal cavity, through injection on the anterior surface of the fifth lumbar vertebra. Through this procedure it is possible to remove the pelvic colon by the abdomino-sacral operation without narcosis, by which the results of the operation can be considerably improved. I have used this type of parasacral anaesthesia in 38 cases of abdomino-sacral resection and needed the support of a general narcosis in 27 cases. The mortality of the abdomino-sacral operation for cancer, which in many clinics, in consequence of the numerous deaths from so-called operative shock, amounted to 60 per cent., could be considerably decreased by parasacral anaesthesia. Up to 1922 I had a relatively high mortality (19 cases, with 6 fatalities=31 per cent.), but since then I have had 20 cases with only 2 fatalities, or 10 per cent.

Although not within my field of work, I should like here to remark that, in my opinion, parasacral anaesthesia combined with injection of novocain on the front of the fifth lumbar vertebra and into the ligamentum suspensorium ovarii would be sufficient for every hysterectomy and for other gynaecological operations.

5. *Epidural (Sacral) Anaesthesia.*

Sacral anaesthesia, which was suggested by Läwen, may be applied in operations in the true pelvis, but for laparotomies high epidural anaesthesia is necessary. This is done with the patient in the exaggerated Trendelenburg position and through the use of large doses (50 to 70 c.cm.) of 1½ per cent. solution of novocain. With this technique the anaesthesia will include the lower thoracic segments. High sacral anaesthesia, which has been used largely in gynaecology (König, Schlimpert, Schneider, Kehrer, etc.), is not reliable, and is also dangerous; Schweitzer has collected 10 fatalities in 3,450 cases. On this account it will hardly be accepted as the method of choice. Fidel uses epidural anaesthesia even in stomach resections. He injects 25 c.cm. of 2 per cent. novocain solution below the eighth spinal process, just beneath the ligamentum flavum, which is just punctured by the needle. A complete anaesthesia results in fifteen minutes, and lasts for from one to one

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EVALUATION OF RISK, BLOOD PRESSURE PROTECTION, AND NITROUS OXIDE-OXYGEN ANAESTHESIA AS VITAL FACTORS IN SAFER GASTRIC SURGERY.

SAFER gastric surgery with precise methods of risk evaluation to the patient has in forty-six years reduced the operative mortality from 36 to 4.6 per cent. for the year 1925, as reported by several of our leading surgical centres. To appreciate the factors entering into this improvement, and to approach more nearly the Utopian dream of no morbidity and 100 per cent. cures, I beg of you to bear with me in their consideration as follows: (1) The evaluation of the patient's resistive strength, or the potentiality of each individual case. (2) Blood pressure protection. (3) Nitrous oxide-oxygen anaesthesia.

The mensuration of potentiality in gastric surgery offers a nicety that is found in no other field. While this class of patient is coming to surgery considerably earlier in their disease than formerly, yet there exists an astonishingly high percentage that have been treated for years with no more definite diagnosis than "dyspepsia" or "indigestion." This, of course, leads to a great loss in nutrition, which must necessarily affect the physiology of all important organs, particularly the blood chemistry. Whether the pathology present is that of an ulcer or whether it be malignancy, one is apt to be dealing with a patient who has been ill for a very long time, and is therefore far below par in many respects. Unusual care is needed to bring him safely through the operation and assure him of the least further disturbances to his alimentary tract.

In estimating the risk it is customary in most clinics during the last decade to carry out certain routine investigations that are thought by all to be a necessity. Among these might be mentioned a most careful clinical investigation, with stress upon history-taking, to be followed by laboratory aids, such as chemical, bacteriological, physiological, roentgenological, electro-cardiographs, and others. These are all exceedingly important, and are to be encouraged. However, may I here interject the thought that our graduates in medicine may become so accustomed to relying upon laboratory and technical apparatus that they may fail to develop the faculty to draw reasonably proper conclusions from the history and general clinical picture; at least, is it not reasonable to give the clinical picture a bit of thought before writing orders for the use of every appliance in the hospital? Fearing, however, that I may be misunderstood, let me insist that we bring to every case every known aid for determining the exact condition present; for it is certainly possible by so doing to change many cases of extremely bad risks to at least fair risks. Many cases needing gastric surgery will have been vomiting, probably for some time, resulting in a great lack of fluids, and probably a profound acidosis, due to a lack of nourishment. It is also possible to have the opposite condition, alkalosis, and this is especially true if the patient has had persistent emesis with loss of hydrochloric acid, or has been treated by means of large doses of sodium bicarbonate. These conditions are easily determined by finding the carbon dioxide combining power of the blood plasma, and a urinalysis. The determination of chlorides in the blood is highly important, for while we may not know what becomes of them we do know that they are a necessity in combating the toxaemia so often present in the obstructive type of cases. Being aware of such conditions, we are forewarned and forearmed, and the treatment is easy and reasonably certain in its effects. Most certainly the blood must receive much further study, demanding at least the tests for lues, sugar, red and white cell count, and haemoglobin. More and more we feel the grave importance of a full knowledge of the character of the spinal fluid. We believe the liver and kidney functions to be exceedingly important in surgical cases, and no effort to measure these should be neglected. We are rapidly gaining confidence in skilful interpretation of roentgenograms of the chest as useful aids in determining the condition of the lungs, heart, and larger vessels. The psychology of the patient has been too long neglected, and we may do well to seek his co-operation in all our efforts. It is probably true that the function of all important organs is markedly influenced by the psychical attitude of the patient.

Many years ago—twenty to be exact—long before the general and special laboratories were giving the aid that we find to-day, we were confronted by the fact that we had no standardized tests for measuring the risk confronting us. An incomplete urinalysis and hasty examination of the heart and lungs comprised the usual investigations. It was at this time that in America the question of blood pressure was attracting attention among our leaders. True, one heard of only one pressure, the systolic. We soon found that this information fell far short of giving us the necessary guidance for formulating a rule. It probably does represent the total labour that is being expended by the arterial system at a given time. It is affected by many factors, including even psychical disturbances—as anger and fear, for example.

With the inestimable aid of my anaesthetist, Dr. McKesson, we then commenced a systematic study of the whole question of blood pressure, keeping records of our findings previous to, during, and subsequent to operations. We had little aid in this work from the literature, as Janeway's book, which was published in 1907, advocated the observance of only the systolic pressure in guiding surgeons. It was the first formidable treatise on the subject of blood pressure we found. Every case operated on furnished us with interesting data. These results finally gave us the necessary information to enable us to formulate an index for operability. In this work we received valuable aid from Dr. W. J. Stone, who was then medical chief of Flower Hospital, where most of our investigations were made. In order to express this index in percentage we coined the term "pressure ratio." This is obtained by dividing the pulse pressure by the diastolic pressure, thus:

$$\frac{\text{Pulse pressure}}{\text{Diastolic pressure}} = \text{Pressure ratio per cent., or Index for operability.}$$

$\frac{40\ \text{P.P.}}{80\ \text{D.P.}}$ = 50 per cent. normal. $\frac{20\ \text{P.P.}}{80\ \text{D.P.}}$ = 25 per cent. inoperable.

Rule.—If the pressure ratio is high or low there is reason to apprehend danger. If it lies between 30 and 70 per cent. the case is probably operable; if below 25 per cent. or above 75 per cent. it is probably inoperable.

In applying the rule during the operation it gave us early warning of shock, and enabled us either to apply remedial treatment or to bring the operation to a close. Finally, after eight years of testing this rule, I read our results and conclusions at the twenty-ninth annual meeting of the American Association of Obstetricians and Gynecologists in 1916, in a paper entitled "Observations on blood pressures during operations." The rule has been checked by numerous leading anaesthetists in America on many thousand cases, notably by Dr. Miller of Providence and Drs. Ruth and Tyler of Philadelphia, reporting their conclusions in two papers. As our continued use of this rule

(7.1 per cent.). The importance of the anaesthesia is seen by the fact that in cases of advanced cachexia the resection can still be successfully performed; even in 13 cases where the patients weighed less than 80 lb. before the operation, they all recovered. On this account a two-stage resection of cancer is unnecessary.

Fatalities within forty-eight hours after the operation are very rare. Even with my extended indication for resection (435 cancer operations, 264 resections, 7 complete gastrectomies, 75 gastro-enterostomies, and 89 exploratory laparotomies) I had only one death within forty-eight hours after the operation—in a man aged 73 years who had undergone subtotal resection of the stomach.

The results of resection in old patients are not really worse than among the younger; for in the 88 patients over 60 years of age there was a mortality of 22.4 per cent., as contrasted with 20.8 per cent. in all the resections. In 52 cases of uncomplicated stomach resections the mortality was 9.6 per cent., while in 36 cases complicated with liver and pancreatic resection it was 41.7 per cent.

My results in a small series of gall-bladder operations also show the satisfactory effect of the anaesthesia, in so far that fatalities from operative shock and liver insufficiency as well as from pneumonia are absent, and also that the results are satisfactory in old patients.

There were 5 fatalities in 216 cholecystectomies, of which 2 were due to lung emboli, 2 to peritonitis, and one to post-operative haemorrhage in a case of Basedow's disease which also had an associated gastro-enterostomy. The mortality is therefore 2.3 per cent. In 43 cases of cholecystectomy and choledochotomy for obstruction due to stone there were 4 fatalities. These were: a woman, aged 65, who died four weeks after operation from a subphrenic abscess; an emaciated patient (poor food after the war), aged 35, who died from a haemorrhagic diathesis (haemothorax and haemo-pericardium); and two deaths from peritonitis. In 20 old patients (aged 60 to 77 years) there was only one death, despite the fact that three had had common duct obstruction for six months.

In 143 cases of resection of the small intestine there were 87 cases of resection of stomach and intestine for unhealed ulcer following gastro-enterostomy or gastro-jejunal ulcer which will not be considered in this series. As in the 56 remaining cases the resections were necessitated by necrosis of the intestinal wall, the prognosis depended first upon the presence of peritonitis at the time of operation. There were 8 post-operative deaths: of these, 5 were due to peritonitis and gangrene, and one to haemorrhage into the adrenal; one was a woman, aged 76, who died one day after resection of 4 metres of strangulated gangrenous bowel; one was a man, aged 62, who died twenty-four hours after resection of 2½ metres of gangrenous jejunum caused by thrombosis of the superior mesenteric vein; death was probably due to thrombosis of the vena porta, which may have been present at the time of operation. Despite the fact that 19 patients were over 60 years of age, there was no fatality from pneumonia. Out of 9 patients who were between 71 and 81 there was only one fatality—that of the 76-year-old woman already mentioned.

In colon resections the results have been markedly improved; this is due to the fact that among my cases not only have there been no deaths from pneumonia, but also that post-operative intestinal atony, which endangers the suture, has not been observed; and again, that with local anaesthesia the operator has ample time to make an exact intestinal suture in three layers, so that with lateral anastomosis no leakage need be feared. It is important that the bowel be empty in one-stage resection. There were 17 fatalities, or 13.1 per cent. mortality, in my 129 cases. In cancer resections the mortality is 23.6 per cent. (55 operations with 13 deaths). In the two-stage resections the mortality was higher (16 operations with 6 deaths), because, in consequence of the invasion of the adjacent organs in 6 cases, beside the colon resection it was necessary to do an extensive resection of the small intestine, in one case nephrectomy, and in one case splenectomy. In the one-stage resection of the caecum and colon ascendens the mortality is high (20 cases with 5 fatalities), because formerly the one-stage operation was done also for acute obstruction. In the one-stage resection for cancer of the descending and sigmoid colon the mortality is lower (19 cases with 2 deaths). One patient, operated on during the war, died from peritonitis without insufficiency of the suture line, and the other was a patient aged 68, who died two weeks after operation from a recurring heart insufficiency, from an attack of which he had suffered three months previously. It is of further interest that there were 11 patients in this series who were 60 to 75 years of age with only the one above mentioned death.

CONCLUSION.

In major abdominal operations general narcosis with ether or chloroform injures the parenchymatous organs on account of its longer duration. This may lead to death through insufficiency of the organ.

These injuries to the organs may be avoided by the use of *combined* anaesthesia; therefore it should be employed in every greater laparotomy in which it is impossible to perform the whole operation under regional anaesthesia. In combined anaesthesia nitrous oxide or narcylen is the least injurious.

Mesenteric anaesthesia is almost harmless and may be resorted to in every case. It is the most effective agent in the combined anaesthesia.

Paravertebral anaesthesia should be used only in operations in which the injection on one side is sufficient.

Splanchnic anaesthesia after the method of Braun is almost without danger, and in about 90 per cent. of operations on the upper abdomen sufficient.

Parasacral anaesthesia, combined with blocking of the lumbar segment, is sufficient for radical operation for cancer of the rectum and for all gynaecological operations.

By the use of regional or combined anaesthesia the results of major abdominal operations are improved, because death from so-called operative shock, pneumonia, and atony of the bowel can be almost always avoided.

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when used in connexion with gentle and skilful surgery offers just those things to the patient.

In closing, I wish to offer these few following conclusions, which Dr. McKesson and myself both feel have been proved during twenty years of more or less constant team work:

1. Nitrous oxide-oxygen as an anaesthetic, although difficult of administration, is by far the safest anaesthetic in skilled hands.
2. It produces anaesthesia without appreciably injuring any cells in the body, in a pleasant manner, in a brief time, and without, except in rare instances, the much-dreaded debilitating nauseous experiences which are the rule with ether.
3. Notwithstanding many published statements to the contrary, it may be successfully used in all abdominal surgery, and is especially indicated in cases requiring great length of time.
4. It favours the production of the very best psychical condition of the patient, and therefore predisposes to a higher percentage of permanent cures, with shorter periods of morbidity.
5. It favours the growth of more skilful anaesthesia, which is greatly to be desired
6. While the degree of M.D. carries with it the legal right to administer anaesthetics, there is a moral responsibility which requires special training for this work.
7. The surgeon must realize constantly that he is dealing with a living organism and not a mere mechanical device, and that rough traumatic attack will be followed by depression and shock in many cases.

III.—Dr. T. BRANDT,

Bergen.

Acetylene-Oxygen Anaesthesia in Gastric Surgery.

During examinations regarding the effect of nitrous oxide gas, H. Wieland thought of trying a gas which in pharmacological respects acted like nitrous oxide gas, but which at the same time was more soluble in the blood—namely, acetylene. Thereby he hoped to be able to simplify the narcotic apparatus considerably, and also to provide a means that possessed all the advantages of nitrous oxide gas anaesthesia. Together with C. J. Gauss, the Würzburger gynaecologist, he prepared an acetylene narcotic, and this seems now to have triumphed throughout Germany.

Chemically pure acetylene is employed for the narcosis. It possesses a faint smoky smell and a slightly sour taste; thus in no way does it resemble the "acetylene odour" we are acquainted with from carbide lamps. It has been placed on the market under the name of "narcylen," in large (1.6 metres high) steel cylinders; such a cylinder is sufficient for twenty hours' narcosis. The gas is produced from calcium carbide, but is thoroughly cleansed of all impurities, including H_2S and the extremely poisonous phosphoric hydrogen. Possibility of explosion of the cylinder has been quite eliminated by a patent arrangement. During the narcosis oxygen must also be administered from an ordinary oxygen cylinder. The mixing and dosing of the gases take place through a narcotic apparatus, which has been constructed by the firm of Draeger, and somewhat resembles that firm's apparatus for ether and chloroform anaesthesia.

From the oxygen containers and the "narcylen" cylinder the gases are directed to their respective manometers, which show the quantity of gas in the container. The acetylene passes first through two purifying bottles of ordinary water—in order to remove the acetone—before mixing with the oxygen in the "gas mixer," thence it is led into a large balloon, which serves as a reservoir. The gas mixture is administered to the patient through a strong tube, and a special narcotic mask made of rubber which can be easily adapted to fit the patient's face. The mask has a ventilating apparatus similar to Sudeck's ether mask, and allows the respiratory air to pass in one direction only. One half of the apparatus is arranged like Roth-Draeger's, so that it is also possible to administer an ordinary anaesthetic, or a mixture of ether and acetylene. The whole mechanism has a somewhat complicated appearance when seen for the first time, but it is easily learnt, and acts well.

The administration of the anaesthetic is very simple. The apparatus is first examined to see that it works properly. The mask is then applied very carefully, as it must fit tightly round the face. The mask covers the nose, mouth, and parts nearest to these, but not the eyes, in order that the corneal and pupillary reflexes may be observed. When employed for long narcosis it is generally fixed round the head with a strap arrangement. When placing the mask in position a little oxygen is given; if all is then in order, the gas mixture is administered—70 per cent. acetylene and 30 per cent. oxygen. It has been proved that such a mixture is the most suitable when introducing the narcotic. The correct proportion of the gases is read in percentages from their respective manometers.

Most people find the smell of "narcylen" almost pleasant, and it is a rare occurrence for patients to be unable to breathe freely on account of the smell, as is often seen with ether or chloroform anaesthesia.

The patient becomes unconscious quickly, in practically all cases after one, or at most two, minutes. If it takes longer than this, it may almost always be attributed to the fact that the mask does not fit properly. In certain cases there is slight excitement, but nothing compared with what is seen in chloroform, ether, or ethyl chloride. As a rule it is quite absent. It is possible to commence operating one or two minutes after administration of the narcotic; but if really perfect relaxation of the muscles is desired it is advisable to wait five minutes.

When the patient is under the anaesthetic the quantity of acetylene is reduced (5 per cent. for every five minutes) in order to find the concentration that produces the most effective relaxation of the muscles and deep narcosis respectively. Then it is desirable to remain at this proportion. As a matter of fact, experience has proved that the patient can be kept under the anaesthetic for hours with 20 to 30 per cent., and that with 40 to 50 per cent. there is generally less tension of the muscles than with a greater concentration.

If the patient has partaken of food immediately before, it may happen that he will vomit, but vomiting or retching scarcely ever takes place if the anaesthetic is given on an empty stomach.

When it is desired to finish, the mask is removed, and if a low percentage of acetylene has been employed the patient awakens practically momentarily. In the case of more concentrated mixtures, perhaps two, but seldom more than five, minutes elapse before the patient regains consciousness. Excitement is even rarer than during induction. In the majority of cases the patient feels quite well afterwards. Headache and sickness are seldom met with, and by no means as frequently as after chloroform or ether narcosis.

When under the anaesthetic the face becomes slightly flushed. Cyanosis is rare, but it may, of course, appear here as in any other anaesthetic when the tongue falls back and the passage to the windpipe is obstructed, or when an insufficiency of oxygen is administered. The cyanosis encountered when in very profound ether or chloroform narcosis, which is attributable to poor ventilation of the blood on account of respiratory paralysis setting in, does not occur during acetylene narcosis. The reason for this is that acetylene is a very weak anaesthetic, which even in the greatest concentrations is not capable of paralysing the respiratory centre. Overdose is therefore an impossibility.

The anaesthetic does not appear to have any effect on the function of the heart, although the blood pressure—as is the case in nitrous oxide gas anaesthesia—rises quite considerably, and can increase up to 20 to 40 or even 50 mm. of mercury. The cause of this is not known. The pulse remains unchanged. Acetylene does not appear to have any effect on the liver or kidneys either. It is possible, therefore, to anaesthetize the same patient several times without fear of symptoms of intoxication, such as occur in the repeated use of ether or chloroform..

Acetylene anaesthesia reminds us very much of nitrous oxide gas anaesthesia, and from the experience gained it

has only added to our then acquired confidence, I take the liberty of repeating the conclusions given in 1916.

1. The systolic pressure alone is of very slight, if any, value.
2. The diastolic pressure alone is of much more value than the systolic alone.
3. The pressure ratio is the essential factor, and offers the earliest danger signal.
4. There are certain elements in technique which have marked and constant effect upon the pressures. These are as follows:
   (*a*) The psychical or emotional state of the patient.
   (*b*) The position of the patient upon the table, the extreme Trendelenburg being the worst.
   (*c*) Overdosing by the anaesthetist.
   (*d*) The amount of traumatism inflicted by the actual operation, such as cutting and tearing the tissues with the hands, scissors, or other dull instruments; the packing of large gauze packs instead of rubber tissue into the abdominal cavity.
   (*e*) The preservation of the fluids in the body up to the hour of the operation, this being absolutely necessary to maintain the usual pressure.

In an article appearing in the *Canadian Medical Association Journal* during 1925 the author, Dr. F. H. McMechan, very kindly refers to our work, and very properly makes the following additional statement:

"However, what happens during an operation may invalidate any assurance of safety first under Moots's index of operability, and for this reason the Anaesthesia Research Society insists upon five-minute blood pressure guides and protection during the entire period, and has established certain degrees of circulatory depression for the information of the surgical team. These, as first formulated by McKesson and then adopted by the committee of the National Anaesthesia Society, are:

"(1) *Safe.*—Fifteen per cent. increase in pulse rate without increase in blood pressure; or 10 per cent. decrease in blood pressures without a decrease in pulse rate.

"(2) *Dangerous.*—Twenty-five per cent. increase in pulse rate, *plus* 10 to 25 per cent decrease in blood pressures.

"(3) *Shock.*—A pulse rate of 100 and rising with progressively falling blood pressures reaching a systolic of 80 mm. or less. If shock continues for thirty minutes or more during operation, without effective remedial measures, death is almost inevitable in twenty-four to seventy-two hours. This guide discloses the onset of shock at least twenty minutes earlier than it is indicated in any other way."

During the past year we have, at the Lucas County Hospital, added another test, known as the "Energy Index." This is the sum of the systolic and diastolic pressures multiplied by the pulse rate. The numerals of thousands only are used. Thus:

Systolic *plus* Diastolic times pulse rate = Energy index.
120 „ 80 „ 72 = 14,500 mm.

This result would be read as "fourteen." Cases with this index at 12 to 18 would be considered safely operable.

While this test seems to coincide with our own rule, we have used it but a short time, and will require experience with it before making a positive statement as to its utility. May I add at this time that the determination of our own rule and that of the energy index rule at the completion of the operation renders a most useful guide to post-operative convalescence or for subsequent therapy?

Now as to the question of the relationship of nitrous oxide-oxygen anaesthesia to our general subject, let it be fully understood that I do not urge this agent to the exclusion of all others. Rather, I would advocate *professional anaesthesia* as the most important factor, in that this will ensure continued professional research, which will bring the largest measure of safety to the patient.

There is considerable discussion at this time as to the nature of the action of the different agents used in causing narcosis. Personally, we have held to the idea that the chemical reactions which favour nitrous oxide anaesthesia are, briefly, as follows:

It procures anaesthesia by reason of its interference with the use of oxygen by the brain cells, apparently exerting no other influence except this oxygen interference; furthermore, its total effect on the body continues but a few minutes beyond the termination of its administration. In fact, the dangers and difficulties of nitrous oxide administration are practically all technical and therefore controllable.

Ether, on the other hand, probably produces anaesthesia by dissolving the lipoids of the brain; in addition, it also dissolves the lipoids in many other exceedingly important structures, such as the lecithin in the red corpuscles, the fats in the kidneys, the liver, and even the lipoids in the phagocytes. Its difficulties, therefore, come from a chemical source, often delayed, and apt to be uncontrollable.

In 1907 Dr. McKesson and I became interested in nitrous oxide-oxygen in a small way. At first our difficulties were many, ignorance of the necessity of joint study and co-operation, poorly devised equipment for administration, and a lack of experience in the signs of this form of anaesthesia being the causes, in the light of our present knowledge.

It is true that for two or three years we had some of the troubles commonly attributed to gas anaesthesia, but we felt that as the apparatus was improved and our experience broadened, these difficulties might be overcome and we could offer our patients some decided advantages. Our great difficulty was due to less relaxation than we had secured under ether, and the necessity of adding ether to the gases too frequently. This problem was not solved in a month, or even a year; but, instead of condemning the principle, we intensified our investigations. Finally, we found that by sympathetic co-operation it was quite possible to perform any major operation under this form of anaesthesia, with very few unpleasant experiences on the part of the patient. There being no unpleasant odours, the period of inception of narcosis being very brief and tranquil, post-operative nausea averaging 4 per cent., all have much to do in removing the dread of surgery, and add much to the brevity of morbidity, and is especially to be sought in gastric surgery where nutrition is greatly needed. To-day we are happy in the conscious enjoyment of a technique which leaves little to be desired.

To obtain the benefits of such a technique, which includes complete muscular relaxation without added danger, requires the combination of skill and hearty co-operation between surgeon and anaesthetist, as well as of all who have to do with the pre-operative preparation of the patient, which preparation should be of the nature to prevent as many adverse stimuli as possible from entering the patient's nervous system. While haste is to be condemned, yet when an operation has been decided upon it should be done without unnecessary delay. This minimizes adverse stimuli coming from well meaning but uninformed friends. Officials and nurses about the hospital must understand the importance of proper psychical suggestions. Complete rest during the night preceding the operation is secured by whatever sedative is considered best for the individual case. We always use some preliminary narcotic, except in the cases at the two extremes of life—the very young and the aged. In the latter, we do not hesitate to use morphine alone, believing that it is the best single agent for preventing shock during and following operative procedures.

For the average sized adult patient our usual dose is morphine sulphate 1/6 grain with scopolamine 1/200 grain, given hypodermically two hours before the operation; this is repeated one hour before operation; the dosage is varied according to the age, size, and psychical state of the patient as well as the type of operation to be done. All visitors, including relatives, are excluded from the patient during these two hours. By these means the patient reaches the operating room practically asleep, at least with absolutely no fear, and therefore with an exceedingly high threshold to external as well as internal stimuli.

The operation started, we believe that it should be completed in the briefest possible space of time compatible with the best work. Our blood pressure records show that time is a factor not to be ignored. They also give us convincing evidence of the depressing effect of rough handling of the abdominal viscera and tight packing with gauze. One of the great blessings of nitrous oxide anaesthesia is that it fosters the same gentle touch by the surgeon that is necessary in the use of local anaesthesia. This is a very distinct gain for the patient. All of these points affect not only the mortality, but the morbidity as well. We are realizing more and more that it should be our aim not only to save life, and to cure the disease if possible, but to return the patient to his position in society in the briefest possible time, subjecting him in the meanwhile to the least possible danger and discomfort. We feel that expert professional nitrous oxide anaesthesia

the best results of all in gastric surgery; this consists in administering a mixture of nitrous oxide, oxygen, and ether through a tracheal catheter. I have now employed this method as a routine for five years in about 3,500 cases, of which about 1,100 were for upper abdominal operations.

Although endotracheal anaesthesia has been practised for some years, the war brought it into prominence as affording the only satisfactory technique for plastic facial surgery. The anaesthesia obtained was so uniformly excellent that in 1920 I tried the same method for major abdominal surgery, and the results were so encouraging that I have continued it up to the present time.

The apparatus required is not extensive. Any sight-feed gas and oxygen machine can be employed, although it is better to have either a pressure gauge or mercury manometer connected with the exit tube to give an indication of the endotracheal pressure. If all the connexions are rigid, an adjustable safety-valve is also advisable, but in most types of apparatus the corks will blow out of the bottles long before a dangerous pressure is reached.

The technique is as follows. The patient is given a preliminary atropine injection and is fully anaesthetized by any method which the administrator prefers. When the jaw muscles are completely relaxed a direct-vision laryngoscope is passed along the dorsum of the tongue until the epiglottis is seen. This is gently pushed forwards with the curved end of the laryngoscope, and the glottis will then come into view. The end of a tracheal catheter is then smeared with sterile vaseline and slipped between the vocal cords and pushed onwards for another three to four inches. The laryngoscope is then withdrawn, and the proximal end of the catheter connected up to the exit tube of the gas and oxygen machine. Difficulties in passing the catheter are nearly always due to the patient being insufficiently anaesthetized. In this case it may be almost impossible to see the glottis, and even if this is accomplished the cords will probably be in a state of adductor spasm. If a catheter is then forced between them some post-operative laryngitis will almost certainly ensue. Opinions differ as to the best position for the patient's head. I have found that if it be placed just flat and exactly in the middle line little difficulty is usually experienced in finding the glottis. Hyperextension of the head, on the other hand, although favoured by laryngologists, stretches the soft parts and should be avoided. When the catheter is in position, a mixture of 50 per cent. nitrous oxide and 50 per cent. oxygen passing through ether is first employed. This may cause a certain amount of coughing, which soon passes off as the anaesthesia becomes more profound. The amount and proportions of the gases are then regulated until the colour of the mucous membranes is just pink and the manometer shows a pressure of about + 5 mm. Hg on inspiration. In an average case the breathing becomes shallow and regular as in a sleeping patient, but occasionally there is a certain amount of obstruction to the return airway due to a large tongue, in which case an artificial airway should be inserted. Two catheters are, as a rule, quite unnecessary in gastric cases. By increasing the proportion and pressure of oxygen the respiratory movements can be brought down to practically zero, and, indeed, complete apnoea may occur for a considerable time, the oxygen diffusing through the bronchioles and alveoli sufficiently rapidly to oxygenate the blood. This, of course, is of great assistance to the surgeon when performing anastomoses, as the suture line is perfectly still.

In long gastric operations it is always advisable to take blood pressure and pulse records at least every five minutes. This can easily be done by strapping a stethoscope end over the brachial artery in the antecubital fossa just below the cuff of the sphygmomanometer. Systolic and diastolic pressures should both be taken, and, if possible, recorded as a graph. In my opinion the best indication of the patient's general condition is given by observing the tendency of the pulse pressure and pulse rate. By this means ample time is given for antishock methods to be adopted before severe collapse has occurred.

Post-operative pulmonary complications can be minimized in two ways. First, at the end of the anaesthesia the gas-oxygen-ether mixture should be switched off and a mixture of 90 per cent. oxygen and 10 per cent. carbon dioxide from a separate cylinder substituted. This will cause immediate forced breathing by the stimulation of the respiratory centre by the carbon dioxide. The ether vapour will consequently be rapidly washed out of the lungs, the blood will be fully oxygenated by the 90 per cent. oxygen, and the bases of the lungs will be expanded by the hyperpnoea. Patients can be brought round very rapidly by this de-etherizing process, but in gastric cases it is better to discontinue it after about five minutes. The patient will then relapse into a state of light anaesthesia and will remain free from pain for a considerable time. The second way to avoid respiratory complications is to give small doses of atropine repeatedly for three days after operation —gr. 1/200 hypodermically three times a day is a useful average dose. The only possible objection to this treatment is the antispasmodic action of the drug, which might possibly predispose to paresis of the bowel, but I have never seen any trouble follow from this cause.

Let us now consider how the four requirements mentioned at the beginning of this paper are met by the endotracheal nitrous oxide-oxygen-ether technique.

1. Minimal respiratory movement. It will be admitted by most that this method affords less respiratory excursion than any other form of general anaesthesia. It is, in fact, the only way in which we can produce prolonged apnoea with safety.

2. Muscular relaxation. This should be complete. It is obvious that if a catheter is lying between the vocal cords, laryngeal spasm from peritoneal traction cannot occur, and so relaxation should be continuous throughout all stages of the operation.

3. Protection from operative shock. If the suggested practice of recording graphically the systolic and diastolic blood pressures and pulse rate is adopted, the first signs of shock can be detected and treatment instituted without delay. The endotracheal method does not, of course, protect the central nervous system from traumatic stimuli transmitted by the sympathetic system in the same way as does splanchnic block, but I am doubtful whether this is not more than counterbalanced by the continuously low blood pressure involved by the latter method.

4. Absence of pulmonary complications. I have found that if the two suggestions mentioned above are carried out the endotracheal method compares favourably in this respect with any other general, local, or combined technique. It is impossible to eliminate respiratory complications entirely from upper abdominal surgery, as a certain proportion are undoubtedly due more to the operation than to the anaesthetic.

Finally, the best argument in favour of the method which I have endeavoured to describe is that when a surgeon has once operated with it he almost invariably prefers it in future cases.

GENERAL DISCUSSION.

Mr. K. W. MONSARRAT (Liverpool) said that in abdominal surgery the surgeon required an anaesthesia which was rapid in induction, gave complete muscular relaxation, did not add to the influences producing shock, and was not followed by pulmonary complications, vomiting, and meteorism. None of the toxic substances by the administration of which general anaesthesia was produced could singly fulfil all these desiderata. No method and no anaesthetic should be considered as routine. Thus, in the case of a powerful, somewhat stout man on whom a gastro-enterostomy was to be performed, gas and oxygen with ether anaesthesia, though valuable in many other cases, was not a good method. In order to get adequate relaxation a proportionately large amount of ether had to be used, and gas, ether, and oxygen anaesthesia, when a considerable quantity of ether had to be used, was very liable to be followed by pulmonary complications. Such a patient had a smoother time if anaesthetized with warmed ether vapour by the Shipway plan. Mr. Monsarrat next remarked on the value of combining the general with a regional anaesthesia; in his own practice a local or regional anaesthesia was always employed. He infiltrated two planes with 0.5 per cent. novocain—the skin and the subperitoneal; this local anaesthesia was the general rule, but in a minority of cases he injected intercostal nerves,

seems to possess all its advantages, but also some of its disadvantages.

Let us look at its advantages. It must first and foremost be mentioned that it is harmless. A decided opinion can, of course, only be arrived at after some years of experience; but no case of death has up to the present been reported. It is undoubtedly a very pleasant form of anaesthetic for the patient. As far as the anaesthetist is concerned, a great advantage is that unconsciousness sets in rapidly and without any excitement, and also that recovery takes place, so to speak, immediately after removal of the mask. Another great advantage is that it is practically free from after-effects in the form of sickness or vomiting. Moreover, it is so simple to administer that it can be entrusted to less experienced anaesthetists, as overdosing with resultant respiratory paralysis is not possible.

But it has its drawbacks also. It requires a complicated and expensive apparatus. "Narcylen" and the oxygen cylinder are not cheap either, so that the anaesthetic, apart from the apparatus, is three or four times as costly as ordinary ether. Merely on account of the expense, therefore, it will be difficult for it to compete with ether or chloroform, if experience should not prove that its advantages—especially its harmless nature—are considerably greater than we are at present aware of.

As we all know, acetylene gas is very inflammable, and the acetylene-oxygen mixture highly explosive. It might therefore be thought that with this anaesthetic it would be impossible to make use of a naked flame in the operating room (boiling of instruments, thermo-cauterization); such is not the case, however. As is also the case with ether, a certain risk is always present, and especially in abdominal and gynaecological operations, where we often have recourse to thermo-cauterization, this proves a disadvantage. To be on the safe side, certain operators never make use of it in operations where they think they may have to cauterize. An accident in Munich showed that this is no exaggerated precautionary measure.

The greatest drawback is, however, that pure acetylene is not always sufficiently powerful, even though it be quite sufficient for most surgical operations. In laparotomy, where, of course, a deep narcosis is often required, the continuance of muscular rigidity may give rise to some anxiety, and it has happened that surgeons have had to resort to ether or chloroform during the operation. If a scopolamine-morphine injection (0.0003/0.015 g.—0.02 g.) has been administered beforehand—as recommended by Wieland and Gauss—then we may certainly depend on satisfactory muscular relaxation; but, on the other hand, we have no longer a purely acetylene narcotic: it becomes now to a great extent a mixed one. As previously mentioned, the apparatus is so arranged that it is possible to administer to the patient an ether-acetylene mixture when the narcosis is not profound enough; but experience seems to show that this mixture is not a particularly good one. Others, again, recommend it.

Some operators assert that acetylene anaesthesia causes increased capillary bleeding; in certain cases it is said to have been very troublesome. Several operators have, however, not noticed this, and personally I am of the opinion that capillary bleeding is no more intense than with ordinary ether anaesthesia. Again, as previously mentioned, the blood pressure rises quite considerably, and the acetylene narcotic ought, therefore (as is the case with nitrous oxide gas), to be contraindicated in patients with hypertonia. This is, so far as is known, the only contraindication. It has, as a matter of fact, been made use of in several instances of haemorrhagic diathesis, in badly compensated defects of the heart, in pulmonary tuberculosis, and chronic bronchitis, without noticing any unpleasantness from its use; but for the present, having regard to the capillary bleeding, we ought also to regard the haemorrhagic diathesis as a contraindication.

If I may—on the basis of the experience obtained up to the present—give my opinion briefly about the anaesthetic, it would be as follows.

"Narcylen" anaesthetic is a clinical anaesthetic, excellent for all surgical work where a very profound narcosis is not required. It is also well suited for laparotomies, but only in conjunction with a previous scopolamine-morphine injection. On account of its simple administration, the rapidity of the narcosis, the rapid coming to, and the inconsiderable after-effects, it seems to be most suited for use in surgical polyclinics. It is also a form of narcotic that deserves the physician's full attention, and quite surely has a future before it, even if it will never quite take the place of ether or chloroform.

The narcotic apparatus has been improved of late. I have, however, no personal knowledge of the new pattern. In it the expired air is conducted back to the apparatus again, where it is purged of the carbonic acid by passing through sodium hydrate. The acetylene passes through the caustic soda unchanged, and is collected in the gas reservoir; thus it circulates in an enclosed circuit. In this way the anaesthetic has become considerably cheaper; so cheap, in fact, that, as regards price, it can compete with ether; at the same time fear of explosion has been reduced to a minimum, as the acetylene gas no longer escapes into the operating room. Those who make use of the new apparatus state that the anaesthesia is as satisfactory as with the older pattern.

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ENDOTRACHEAL NITROUS OXIDE-OXYGEN-ETHER ANAESTHESIA IN GASTRIC SURGERY.

IT will be admitted by all that gastric surgery makes large demands upon the anaesthetist. In the first place, the incision is made in that part of the abdomen in which respiratory movement is at its maximum, so that it is essential that anaesthesia should produce as small a respiratory excursion as possible. Secondly, in order to obtain the best exposure, the recti and other abdominal muscles must be completely relaxed. This desirable result may be difficult to attain owing to the fact that severe traction upon the peritoneum and diaphragmatic attachments may result in reflex laryngeal spasm. In the third place, operative trauma in the upper abdomen gives rise to more shock than is the case in the lower abdomen and pelvis. Lastly, gastric operations tend to be followed by more pulmonary complications than do those on other parts of the body.

The problem, then, is to provide an anaesthetic which affords (1) minimal respiratory movement; (2) absolute muscular relaxation with no possibility of laryngeal spasm; (3) protection from operative shock; (4) absence of post-operative pulmonary complications.

It will be seen, therefore, that an ordinary inhalation anaesthesia does not fulfil all these conditions. If ether be used, either alone or in combination with nitrous oxide and oxygen, the respiratory movements will be comparatively large, although, as an offset to this, the blood pressure will be somewhat raised, thus tending to counteract the fall due to operative shock. The same remarks apply to acetylene-oxygen and ethylene-oxygen mixtures. Chloroform, on the other hand, while affording shallower breathing, is inadmissible on account of the low blood pressure induced during a prolonged administration. Furthermore, in all the foregoing cases laryngeal spasm is always liable to occur and thus prevent complete muscular relaxation.

Turning next to regional analgesia, it is possible to perform high abdominal operations under a combination of splanchnic and anterior field blocks, or splanchnic and paravertebral blocks. In either case, however, we have to contend with an abnormally low blood pressure and poor relaxation towards the end of a prolonged operation. Both disadvantages can be partly overcome by using a light general anaesthesia as well, but this method demands the closest co-operation between surgeon and anaesthetist. In addition, the time taken in preparing the patient is long (about half an hour), and the technique requires a good deal of practice. I have used this combined method for 25 cases of upper abdominal operations, nearly all of which were partial gastrectomies, but the results, although fairly good, were below those obtained with the technique described below.

We now come to the method which in my opinion gives

exaggerated. The surgeon was not only the first violin but the conductor of the surgical orchestra, and consequently the work to be played should be decided by him and not by the anaesthetist, whose role was supplementary. He thought that much could be done in the schools by determining who was and who was not a good anaesthetist before letting a man take up a specialty regularly or occasionally for which he was temperamentally quite unfitted. Teachers should have clear ideas of the capacities of the men they were teaching, and should as far as possible prevent the round peg getting into the square hole.

Dr. F. H. McMECHAN (Avon Lake, Ohio) desired to record his appreciation of the debt overseas visitors owed to the British Medical Association for the chance of taking part in an international reunion. He reaffirmed his belief in the necessity of co-operation between the surgeon and the anaesthetist in the matter of operations, mainly for the benefit of the patient. Everything should be done to make operations as safe, as little unpleasant, and as satisfactory in their results, both immediate and remote, as was humanly possible; to that end co-operation was essential, so that surgeon and anaesthetist should have an intimate knowledge of each other's work and requirements.

Professor FINSTERER, replying, said that the discussion showed that the speakers were of the opinion that in major operations general narcosis with ether or chloroform should be replaced by nitrous oxide or combined anaesthesia. He referred to several papers that had been read, and commented on their main conclusions. The discovery that with endotracheal nitrous oxide-oxygen-ether anaesthesia the muscular relaxation, which was absent in the ordinary administration, could be obtained was very interesting. This relaxation could be more easily obtained by the injection of novocain into the anterior abdominal wall. A deep general anaesthesia was also necessary before introducing the catheter, and he would therefore prefer combined anaesthesia (injection of novocain into the abdominal wall and mesenteries and nitrous oxide) to Hewer's method. He did not insist on regional anaesthesia, as his patients were given ether at once if they felt pain. In all major operations, even when starting with general narcosis, he produced complete local anaesthesia of the abdominal wall and mesenteries, so as to diminish the amount of general narcosis necessary and to prevent shock. This was absolutely necessary if nitrous oxide or narcylen could not be used for the general anaesthetic. In very old or cachectic patients he tried to avoid any ether, as it was in these cases that death from pneumonia was most to be feared.

INTRAVENOUS SOMNIFENE ANAESTHESIA IN GASTRO-INTESTINAL SURGERY.

BY

IAN MACDONALD, M.D., C.M.,

Huelva, Spain.

IN abdominal and gastro-intestinal surgery anaesthesia has advanced with technique, and inhalation anaesthesia by modern methods in the hands of an expert anaesthetist, combined with Crile's method in the abdominal wall, gives most satisfactory results. In the ordinary case the surgeon obtains ease in operating and the patient awakes to an almost painless convalescence. But conditions arise when the surgeon must rely on ordinary, not expert, assistance, and in some countries the qualified specialized anaesthetist does not yet exist. Therefore, especially abroad, efforts are made continuously to eliminate the general anaesthetic or to reduce it to a minimum.

Before, however, adopting new methods surgeons will, I think, exact certain conditions of anaesthesia. The patient must be quite unconscious, the method must be simple, available anywhere without the need of specially trained assistants, the return to consciousness must take place in a reasonable time, and there should be no late toxic effects. These postulates place local anaesthesia alone, or the splanchnic block outside practical anaesthesia. The results of the latter in certain clinics are excellent, in others patients complain most bitterly during the progress of the operation. Splanchnic anaesthesia also usually requires an extra and specially trained assistant. Besides, the objection that the deep bilateral insertion of the long needle constitutes an "anaesthetic operation" seems justified, as some anaesthetists give a general anaesthetic before beginning the splanchnic block. Recently in France the experimental and clinical researches of Fredet and his associates on the use of somnifene in intravenous injection for surgical anaesthesia prove that by the use of this preparation general anaesthesia may be reduced to a minimum—in some cases it may be eliminated. Fredet's interesting researches demonstrate that the seat of action of somnifene is chiefly in the nerve centres; its effect on the liver and kidney is extremely small. He further found that in the commercial product of this name there are two constituents, one with a slow and needlessly prolonged anaesthetic effect. He has eliminated this body, and now employs only the other—namely, allylisopropylmalonylurea, the action of which is rapid and more transient. To obtain surgical anaesthesia with this product it must be combined with morphine, or with morphine and scopolamine. In some cases nothing more is needed, but as a rule a small amount of a general anaesthetic is used to make and to close the incision. The technique of Fredet's method is as follows:

1. A hypodermic injection of morphine is given, varying from a minimum of 1 cg. up to 2 cg. as a maximum. It is advantageous to associate scopolamine with the morphine in doses varying from 2/3 mg. as a minimum up to 3/4 mg. as a maximum, according to the weight of the patient, and whether his general state is cachectic or satisfactory.
2. Twenty minutes later as a minimum interval, or forty-five minutes as a maximum, after the morphine-scopolamine injection, the intravenous injection of allylisopropylmalonylurea is made in a vein at the bend of the elbow with a fine needle and very slowly; three minutes at least should be spent in the injection. The dose is calculated according to weight, age, and the general state of the patient. Generally in fairly robust adults 1 cg. per kg. of body-weight is used, never passing 0.07 gram; personally, we have never passed 0.06 gram. In aged or cachectic patients 0.04 or 0.03 gram should be enough. Ampoules of the drug may be obtained containing 0.01 gram in each cubic centimetre of water.
3. Five minutes after the intravenous injection a small amount of chloroform or ether may be given to permit the incision being made about ten minutes after the intravenous injection. During the operation the general anaesthetic can often be dispensed with, to be resumed should the patient move and at the end to facilitate the suture of the wound.

This technique in practice is extremely simple, the anaesthesia is excellent, post-operative vomiting very rare. Patients awake four or five hours after operation to fall asleep quietly again. Excitement, which was frequently observed after somnifene anaesthesia when first used, is often quite absent with the latest preparation. I have used this anaesthesia in 33 cases during a period of two years, and, though it has not replaced routine methods, it is my choice in two types of cases—when the patient is a bad risk from pulmonary complications or from probable hepatic and renal insufficiency, and again when we are certain the operation must be prolonged. Thus I have used it in most types of gastric operations—gastro-enterostomy, gastrectomy, Balfour's operation combined with pyloroplasty and duodeno-jejunostomy, colectomy, and the prolonged operations needed for the cure of gastro-colic fistulae. In the tedious operation for large ventral hernia in a bronchitic patient and in exploratory operations when cancer is inoperable it has served me well. In several cases of gastro-enterostomy in most debilitated patients, by the addition of some local anaesthesia of the wall, no general anaesthetic was required. In a case of colectomy of the sigmoid for a ring carcinoma neither local nor general anaesthesia was employed; the patient slept deeply, never resenting the inevitable drag of the mesentery during mobilization of the descending colon, which was anastomosed to the rectum by Mayo's tube method. He never vomited afterwards; the pulse never passed 100. One death occurred in this series of cases in a case of intestinal obstruction, the fatal result being in no way connected with the type of anaesthesia. In 9 cases no general anaesthetic was required. In the others, when chloroform or ether was required to make or close the incision or during the progress of the operation, the

in the subcostal grooves in particular, in operations on the upper abdomen. This local or regional anaesthesia had two advantages—it gave a satisfactory relaxation under a comparatively light general anaesthesia, and it obviated a very definite risk. If a skin incision was made when the patient was but lightly anaesthetized (and unless the surgeon invariably operated in association with one anaesthetist this must occur from time to time) the shock was sometimes definite and a fatal syncope might supervene, particularly in children. He wished to emphasize this risk, and he had had experience of two fatalities. In an operation several years ago, for inguinal hernia on a girl aged 8, ether anaesthesia was used and the patient was reported anaesthetized. When the skin incision was made a movement of the legs occurred, followed by blanching of the face, dilatation of the pupils, and a syncope from which she failed to recover. In the second case the syncope occurred at the end of an operation for acute appendicitis in a girl aged 13; no local anaesthetic was used. When completing the operation Mr. Monsarrat remarked that the anaesthesia was light. As the first stitch was put through the skin there was a kick of the right leg and syncope occurred, the respiration gradually failing. It might be said that such accidents should not happen, but even the experienced anaesthetist would admit that under ether anaesthesia the depth of the anaesthesia was not always easy to estimate. Such accidents were, he believed, eliminated by the use of the local in combination with the general anaesthetic. In gastric and bowel resections he infiltrated the mesenteries, using 0.5 per cent. novocain solution.

Professor Finsterer had referred to the damaging effect of chloroform and ether on the viscera, instancing in particular the liver and kidneys; the influence of ether on pancreatic function appeared to be of still more importance. Dr. R. J. Minnitt, who gave the majority of the anaesthetics in Mr. Monsarrat's operative work, had studied and reported on the incidence of ketosis and acidosis following ether anaesthesia, and had also investigated the effect of ether on sugar tolerance. There appeared to be no doubt at all that ether interfered with pancreatic function. This interference was sometimes transient and sometimes prolonged, and its degree had a direct association with post-anaesthetic vomiting. In insulin they had a specific remedy for this complication. It should be given prophylactically; in ether anaesthesia 10 units were administered immediately the operation was completed, and if vomiting occurred the dose was repeated as often as might be necessary. Mr. Monsarrat did not think it was possible to foresee an unusual degree of susceptibility to ketosis and acidosis. This complication was serious when it occurred in the course of convalescence from an abdominal operation. Happily it appeared to be capable of elimination or control by insulin. Dr. Minnitt's investigations had also shown a parallel relation between blood pressure curves and pancreatic disorganization. Gas and oxygen was generally preferable for the majority of abdominal operation cases, but warmed ether vapour was almost its equal, and, in the robust, was on the whole preferable. In critical cases the surgeon and the anaesthetist should meet before the operation and discuss the method of anaesthesia to be used.

Mr. G. GORDON-TAYLOR (London) said that Professor Finsterer had advanced strong and convincing claims for the use of splanchnic anaesthesia in abdominal surgery. He personally had tried local and splanchnic anaesthesia with light ether anaesthesia throughout, as less scopolamine and morphine could thus be used. Splanchnic block was much more easily performed with the patient under general anaesthesia, as psychic shock was thus abolished. In long operations he found that local and splanchnic anaesthesia were satisfactory only for a time, and less so towards the end, so that in this way it was a simple matter to increase the depth of general anaesthesia if necessary. Moreover, with a general anaesthetic there was less strain upon the surgeon and his assistants. There were certain disadvantages in local and splanchnic anaesthetics: they took time to inject, and the blood pressure tended to fall considerably. In one of his cases the fall was sufficient to be very alarming, but the pulse rate was not diminished and the patient recovered. There was no doubt that splanchnic anaesthesia and regional block were great helps to the abdominal surgeon, both during the actual operation and afterwards, as the incidence of chest complications was greatly lessened, indeed almost to vanishing point, and shock and pneumonia had almost disappeared. In lower abdominal cases caudal block was also of use.

Mr. STANFORD CADE (London) stated that he had performed some 200 operations under splanchnic anaesthesia induced by Kappis's method, in which there were three types of danger. In the first, which was accidental and so avoidable, the drug might be injected directly into the blood stream unless repeated aspiration were performed before the fluid was injected. The second was physiological and consisted of the unavoidable fall of blood pressure after the injection of novocain. This could be combated by the prophylactic use of 1.5 c.cm. of pituitrin by hypodermic injection prior to the injection of novocain. The third danger was surgical and consisted in a delayed reaction—namely, a fall of blood pressure with a rise in the rate of the pulse; in his experience this danger was commoner when combined anaesthesia was used. On the whole he was opposed to ether or chloroform being given in combination with regional anaesthesia. The psychic effects could be dealt with by the rectal administration of paraldehyde or by the injection of trivalin with hyoscine, which caused a condition he found the nearest approach to natural sleep. Splanchnic anaesthesia diminished the mortality in cases of intestinal obstruction.

Mr. LOCKHART-MUMMERY (London) said that this meeting marked a definite event in the history of the surgery of the abdomen. Chloroform and ether were certainly not satisfactory in the case of long operations, while regional and local anaesthesia were handicapped by the fact that a really satisfactory local anaesthetic had not as yet been evolved. Regional anaesthesia was still in its infancy. He preferred combined anaesthesia with twilight sleep. He could see no advantage in parasacral over spinal anaesthesia, and the former was very much more difficult of application. The most satisfactory form of general anaesthesia was probably that advocated by Dr. Moots, but he was curious to know how a difficult case of intestinal obstruction could be dealt with under nitrous oxide and oxygen anaesthesia alone.

Dr. S. R. WILSON (Manchester) was anxious to know which was the best method to employ when so many had been described; personally he preferred to judge each case on its merits. The psychic condition of the patient was of the greatest importance, though apt to be entirely neglected. Even the routine administration of atropine was not without danger; he had had a case which showed most alarming symptoms after such an injection, probably due to adrenal exhaustion following the injection of atropine. It was quite conceivable that symptoms might follow when this drug was used in cases of thyroid disease, as there seemed to be some connexion between thyroid disease and the condition of the adrenals. Nitrous oxide and oxygen would do all that a subcutaneous injection would do in cases where regional anaesthesia was employed. Only from the English-speaking races had there evolved a body of men who were specialists in the administration of anaesthetics; many of Professor Finsterer's difficulties were probably the result of the inexperienced being in charge of the anaesthetic. A drawback of complicated technique was that it consumed a considerable time in its application, and a busy surgeon operating as he did in this country, in scattered homes and hospitals, would be seriously hampered by methods which involved great increase in the time necessary for each individual case. Interest was mostly confined to post-operative results, which were undoubtedly much better of recent years than formerly, no matter what type of anaesthesia was used.

Mr. M. MAMOURIAN (Ashton-under-Lyne) emphasized the necessity of progress, but thought that the emphasis laid on the necessity of team work was becoming grossly

A MEDICAL REVIEW OF SOVIET RUSSIA.*

IV.—CHANGE IN TYPE AND INCIDENCE OF DISEASE.

BY

W. HORSLEY GANTT, B.Sc., M.D.

(Formerly Chief of the Medical Division of the American Relief Administration. Leningrad Unit.)

PART I.

MODIFICATIONS in disease have taken place all over the civilized world as a result of the war, influenza pandemic, and social changes, but not on the same great scale as in the Union of Soviet Socialistic Republics (Russia). In no other country were the conditions so bad, and in no other country were the changes in morbidity so enormous. Some diseases became epidemic, others remained unchanged, and a few disappeared altogether.

We have been able to see in Russia the effects of war and famine on all kinds of diseases—surgical, internal, nervous, etc. Some of these changes have been so remarkable, so little has been written about them (even in Russian, almost nothing in English), that I have, during my two and a half years in Russia, collected these facts with a great deal of pains. An enormous number of original MSS., official statistics, and Russian medical articles have been gone over for this purpose, and a certain amount of unpublished detail is included.

The sources of information have been: a large number of original articles written by eminent Russian specialists in the various branches of medicine during the famine, and handed to the author in 1922; the records of the American Relief Administration; inspection trips and observations in the various parts of Russia; statistics of the Soviet Department of Public Health.†

In past wars the greatest destructive element has been disease. Only in the great war and in the Franco-Prussian war of 1870 have the deaths from wounds and from disease been nearly equal. Russia was the exception, if we consider the civil war also; for in 1918-20 there were more deaths from disease than from both the world war and civil war. Dr. Semashko states that, of the 14,000,000 men mobilized, 11,000,000 were lost through wounds and disease together. In 1828 Russia lost in the Russo-Turkish war 80,000 from disease and 20,000 in battle; in 1878 she lost 86,000 from disease and 16,000 in battle (Viry); and in 1917-20, although accurate figures are not available, it is estimated (Karefa-Korbut) that 20,000,000 Russians died, and in 1917-24 40,000,000 died, only a small percentage of which could have been due to the casualties of battle.[1]

FACTORS.

The limits of this paper make it possible merely to enumerate the factors underlying the morbid changes. The war in Russia brought with it the usual disease-producing concomitants of war—restriction of food, disorder, physical and mental suffering. These factors were of much greater magnitude in Russia than in any of the other nations. They combined to produce a tremendous effect on the health of the people, probably involving larger numbers and causing more disease than any other war or calamity in the medical history of Europe.‡

From 1914 to 1917 the decline in living conditions in Russia was similar to that in the other combatant nations; from 1917 through 1919 there was civil war of greater magnitude and destruction than the previous world war, involving nearly every person in Russia; and from 1919 into the summer of 1923 there was famine and starvation affecting three-fourths of the people, and accompanied by epidemics of typhus and relapsing fever afflicting one out of every four adults, and of smaller epidemics of cholera and small-pox. These events completely smashed Russia, to say nothing of the other changes consequent upon two social revolutions. During part of this period everyone led the most primitive life and suffered from indescribable physical, mental, and moral hardships. Since 1922 there has been a gradual return toward normal life for the great mass of the Russian people.

National Resistance.—While the disease-producing factors were greater in Russia, the national resistance was less than in the other European countries. (Under this term are included those forces at the disposal of a nation for fighting disease, such as medical personnel, hospitals, field equipment, public health education, national finances.)

Shortage of Doctors.—Although the individual Russian doctor was well educated, the relative number of doctors in pre-war Russia was smaller than in any other civilized country.* The mobilization of doctors and the large number of deaths among them left many districts entirely without medical assistance. For example, in 1921, when the epidemics were raging, in the Penza Government on the Volga, where one of every twelve people was down with fever, there was only one doctor for the 180,000 people.[2]

A discussion of the hospitals has already been given.[3] The public health organization which the Soviets inherited from the Tsarist regime was almost *nil*, and there was thus a strong contrast between Russia and such countries as Germany and Finland. These two countries also were devastated by war, revolution, famine, and disorder, and epidemics appeared in them at the same time as in Russia, but thanks to their highly organized public health systems, and the general education and cleanliness of the people, typhus was soon checked.

VITAL STATISTICS.

The following table shows the high death rate and low birth rate which resulted during the bad years in Russia, as compared with other European countries. The death rate for 1920-22 was, according to Professor C. A. Novosilsky and other Russian authorities, much higher than the recorded figure of 33.2; in many parts of Russia it reached 85 during the worst period.

TABLE I.—*Birth and Death Rates, 1913 and 1920-24.*

The figures are taken from the Annual Reports of the Registrar-General of England and Wales; from the *Statisches Jahrbuch für das Deutsche Reich*, 1925; and from the records of the "Statburo," Leningrad. The figures for 1913 are for European Russia, exclusive of Poland and Finland.

	1913.	1920.	1921.	1922.	1923.	1924.
RUSSIA.						
Births ...	44.7	33.0*			42.2	41.1
Deaths ...	22.4	33.2*			22.9	22.9
ENGLAND.						
Births ...	24.0	25.5	22.4	20.6	19.7	18.8
Deaths ...	13.8	12.4	12.1	12.9	11.6	12.2
FRANCE.						
Births ...	19.0					19.2
Deaths ...	17.7					17.2
GERMANY.						
Births ...	27.5	25.9	25.3	22.9	21.0	20.4
Deaths ...	15.0	15.0	13.8	14.2	13.9	12.1
ITALY.						
Births ...	31.7	31.9	30.4	30.0	27.9	
Deaths ...	18.7	18.8	17.5	17.6	15.8	
U.S.A.†						
Births ...	25.6			22.5		
Deaths ...	15.0			11.9		

* Average for 1922-23 for R.S.F.S.R.
† Figures for U.S.A. include only the States in the registration area.

The populations of the chief European countries have doubled or trebled during the past century, as a result of the reduction of death rate.[4] This has been brought about mainly by the control of infectious epidemics and the lowering of infantile mortality.

* Previous papers on medical and scientific work in Soviet Russia by Dr. Horsley Gantt were published in the BRITISH MEDICAL JOURNAL in 1924: I, A Review of Medical Education in Soviet Russia, vol. i, p. 1055; II, Hospitals and Health Conditions, vol. ii, p. 336; III, Scientific Work, vol. ii, p. 533.

† I am indebted to Doctor Semashko and other officials of the Public Health Department for the unrestrained use of their figures. See also N. Semashko: Health in Russia, *Deut. med. Woch.*, 1924, Nos. 4, 7, 8, 11, 17, 18, 22, 27, 32, 37, 46, 51.

‡ Sir Humphry Rolleston called attention in 1916 to some of the factors of war in producing disease (*Practitioner*, January, 1916), and in 1920 to some theories as to the change in type of disease. The reader is referred to these for a fuller discussion and bibliography.

* The proportion of doctors in Russia was 1 to 6,000; in Germany, 1 to 1,500; in Great Britain, 1 to 1,400; in United States of America, 1 to 800. Many young doctors have been graduated since the revolution, so that the number of physicians in 1925 in Soviet Russia was 29,000, as compared with 14,000 before the war.

quantities used varied from 8 grams (3 drachms) of chloroform to 50 grams (1½ oz.) of ether. Only in two cases were these amounts exceeded. These anaesthetics were always given by the open method, so that in a hot country where evaporation is rapid patients did not actually inhale these amounts in full. Novocain was generally injected into the recti muscles, 6 oz. of a 1/2 per cent. solution being rapidly administered with a Babcock's self-filling syringe.

Of the 33 cases the results of the anaesthesia and the after-state of the patients were excellent in 29. In 4 cases some post-operative excitement occurred, which was very marked in one alcoholic patient in whom 6 oz. of ether had to be used. In the 3 other cases the agitation was slight and very soon over. With the most recent preparation patients usually awake five or six hours after operation to fall asleep quietly again, and excitement is absent. In my experience, the more cachectic the patient the better the result with this anaesthesia. Though not replacing routine methods, it is at present my method of choice in the type of case I have described. I believe it to be of incontestable value, especially for the isolated surgeon far from the large centre who cannot have the aid of expert anaesthetists.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

POTASSIUM CHLORATE AND CONGENITAL GOITRE.

CONGENITAL goitre was first recorded in 1796; since then several hundred cases have been reported, the vast majority from goitrous districts on the Continent and America. H. H. Skinner in 1924, in the *Journal of the American Medical Association*, reported 12 cases—all, however, from goitrous mothers; he mentions 96 cases from sixty goitrous parents reported by Denne and Richard, and 130 cases collected from the literature by Thévenot in 1909.

In England, however, very few cases have been reported; in fact, I have been able to find records of only 6; of these, 4 occurred in Derbyshire and Cumberland, where goitre is not uncommon. The remaining 2 were reported by Sir J. Y. Simpson and A. R. Simpson, in 1855 and 1866 respectively. The mothers of these two cases had been taking potassium chlorate throughout their pregnancies on account of previous abortions or stillbirths. The parents were healthy and apparently did not reside in a recognized goitrous area.

Other cases must have occurred, but of those cases I have found recorded the mother in 33 per cent. had been taking potassium chlorate; if the cases from Derbyshire and Cumberland are excluded the percentage is 100. These numbers are too small, and even with the two cases I now record may merely be examples of coincidence.

Mrs. S., pregnant for the sixth time, stated that there was a family tendency to miscarriage, stillbirth, and neo-natal death. Her mother's first three children were either stillborn (two) or died in early infancy (one); these were followed by three boys and three girls. The girls all married.

K., the eldest, had first a stillborn boy, and secondly a boy who lived three days. She then took potassium chlorate and had four healthy children.

M., another sister, had a miscarriage at six months and an abortion at three months. She then took potassium chlorate throughout her next pregnancy until the thirty-eighth week, when labour was induced, a female child with a goitre, but otherwise healthy, being born; a subsequent pregnancy, during which she again took potassium chlorate, resulted in a healthy non-goitrous boy.

Mrs. S., the remaining sister, suffered from albuminuria in her first two pregnancies; in the first a macerated foetus was born at term; in the second the foetus (dropsical) was born at the eighth month. In the third pregnancy there was no albuminuria, but the child was stillborn at term. In her fourth and fifth pregnancies she took potassium chlorate. Premature labour was induced at the thirty-eighth week, and living healthy children were born. Throughout her sixth pregnancy she took potassium chlorate (gr. x thrice a day). She did not weigh it, but helped herself with a spoon to what she thought was enough. There was no albuminuria. Labour, in spite of deficient flexion, was easy. The child, a girl, was normal except for a large bronchocele, filling up the whole neck; the swelling was soft and at first ill defined. For the first twenty-four hours the baby's colour was not good; beyond this there was no difficulty in deglutition or in respiration. By the third day the swelling was smaller; the lobes of the thyroid gland extending on either side up under the ears were well defined. The enlargement steadily diminished in size and by the eighth week all obvious enlargement had disappeared.

The goitre in M.'s child was also transient.

There was no previous history of any goitre in the family. No Wassermann test was performed, but neither the mother nor her children showed any stigmata of syphilis.

Potassium chlorate reacts with iodine to form the iodate, and I suggest, as a possible explanation, that the prolonged administration of the salt may result in some of the maternal iodine becoming "fixed" and not available for utilization by the foetus, and that the enlargement of the foetal thyroid is an endeavour on its part to obtain and utilize the necessary iodine for its internal secretion. Such an explanation seems capable of being tested, and the results, if confirmatory, would throw some very interesting light on the causation of goitre in general.

Southsea. R. K. WHITE, M.R.C.S.

HERPES AND VARICELLA.

IN view of the relationship supposed to exist between herpes zoster and varicella, it may be of interest to report three cases, supporting this view, which I have seen during the past three years.

Case 1.—On September 19th, 1923, a married woman, aged 26, developed intercostal herpes. On October 4th (that is, fifteen days later) her child, aged 5 months, was seen with a typical attack of varicella.

Case 2.—On March 17th, 1926, a man, aged 79, developed supra-orbital herpes, which ran a rather severe course, and which left considerable scarring. On April 1st (that is, fifteen days later) his grandson, aged 2, who was living in the same house, developed varicella. The next day his granddaughter, aged 7, also showed signs of a mild, though typical, attack of chicken-pox.

Case 3.—On March 24th, 1926, a child, aged 13, was seen with intercostal herpes, and on April 11th (that is, eighteen days later) her sister, aged 11 months, fell ill with chicken-pox, exhibiting a profuse rash, with the typical distribution of the latter disease.

Apart from the herpes, no other source of infection could be traced in any of these cases. Conclusions cannot be drawn from a few cases, but it certainly seems a very remarkable coincidence when, in one practice, in a short time, three cases of this nature are seen.

Ibstock, Leicester. W. J. MELDRUM, M.B.

CEREBRAL SYPHILIS: CONVULSIONS: DEATH.

THE following case seems of sufficient interest to warrant recording.

W. J. V., a farm hand aged 45 years, was seen by me at 6 a.m. suffering from "fits." The history given by his wife was that he had been quite well until a week previously, and had since been "queer"; he had complained of headache, had "looked ghastly" at times, and threatened to throw himself out of the window. He had continued at work, however, until that morning, when on getting up he "had a fit." He had had no previous illnesses except malaria. He had served twelve years in the marines, and had seven healthy children. His wife gave no history of miscarriage or stillbirth.

He was found to be a muscular man, extensively tattooed. Every two or three minutes he had a convulsion, at first tonic, then clonic. There was no opisthotonos or rigidity of the neck or jaw; between the convulsions he was stuporose and could not recognize persons or obey orders. There was no paralysis or weakness of the face or limbs; the knee-jerks were brisk and equal and both plantar reflexes were normal. The cranial nerves appeared normal; the pupils were equal, moderately dilated, and reacted well to light; the fundi were normal. The heart, lungs, and abdomen were clear and the bladder was empty. There was no penile scar.

An injection of 1/4 grain of morphine and 1/200 grain of hyoscine had no apparent effect on the convulsions. He could not be moved to hospital owing to the inaccessibility of his cottage. At 10 a.m. his condition was unchanged, but he appeared so cyanosed that I removed 20 oz. of blood by venesection and gave him 1 grain of calomel. At 6 p.m. he was obviously moribund; the fits had continued all day and he was then pale, clammy, and with a slow deep respiration and thready pulse. He died at 9 p.m.

A *post-mortem* examination was refused. The Wassermann reaction of the blood was found by the Hampshire county health authorities to be strongly positive.

The rapidity of the fatal issue and the entire absence of any localizing signs would seem to be the chief points of interest.

Lymington, Hants. N. M. GOODMAN, M.B.

districts where the food shortage was most pronounced. For example, in Tsaritizan and Leninsk districts, where the famine was very acute, the number of infectious diseases was much greater than in the adjacent Don and Kopersky districts, even though the population of the two latter was two or three times as great. The only explanation that could be given was their greater food supply (H. Beeuwkes).

TABLE III.—*Correlation of Food, Cleanliness, and Infection for the City of Leningrad.*

Year.	Population.	Official Ration—Calories.*	Fuel (Relative Amount).	Relative Number of Bath Days.	Infectious Diseases per 1,000 Population.	Deaths from Infectious Diseases in Hospitals per 100 Patients.
1916	2,347,851	3,000	?	100	12.3	6.3
1918	1,434,737	1,800	100	50	21.8	9.3
1919	700,000	1,600	25	14	50.1	17.8

* The actual number of calories received was much lower than the official figures.

The recent epidemic of typhus in Russia was probably the largest on record. The last important epidemic before this was that of 1880-81, when there were 15,000 cases in Leningrad and approximately 3,000,000 in the whole of Russia.

TABLE IV.—*Number of Cases of Typhus and Recurrent Fevers, with the Rate per 10,000 Population.*

Year.	Typhus Exanthematicus.		Typhus Recurrens.	
	No. of Cases.	Rate.	No. of Cases	Rate.
1913	105,637	7.2	28,773	2.0
1918	141,638		16,662	
1919	2,240,858		227,927	
1920	2,667,500		1,030,624	
1921	545,587		623,199	
1922	1,556,342	158.9	1,675,120	171.0
1923	245,876	18.4	253,130	18.9
1924	126,946	9.5	49,586	3.7
1925 (Jan.–June)	50,000	3.9	10,000	0.7

These official figures are far too low for the years 1918-22; in 1923, when statistics had improved, we found that they should be multiplied by a factor of 2 to 4 to obtain the correct number.*

These epidemics spread from the south northward, affecting the towns more than the country, and reaching their peak during the famine years. The subsidence may be attributed not only to improved living conditions but to the fact that practically everyone who was not immune had been attacked, and perhaps also, as Sir Humphry Rolleston points out,[7] to the attenuation of the infecting organism. The mortality of typhus was 8 to 9 per cent., and of relapsing fever 4 to 5 per cent., but 14 to 17 per cent. if complicated by paratyphoid.

In 1919 compulsory vaccination of some of the medical personnel (1,000 in Leningrad) was carried out by Handi's method (citrated blood, or vaccine of heated defibrinated blood), and it was alleged that among the vaccinated the morbidity was only one-fifth as great as in those who were not vaccinated, and that no deaths occurred among them.

Typhoid Fever.

In the history of wars, only in the last great war has typhoid fever been an insignificant factor as compared with the casualties from wounds. During the past decade this disease has not increased in Russia. Russian authorities state that there is an antagonism between typhus and typhoid (Jakoleff). The absolute number of cases for the whole of Russia was:

For 1913 ...	... 374,862	For 1921 ...	... 308,000
„ 1914 ...	... 355,000	„ 1922 ...	... 391,815
„ 1918 ...	... 109,000	„ 1923 ...	... 142,012
„ 1919 ...	... 252,000	„ 1924 ...	... 166,399
„ 1920 ...	... 424,000		

The mortality rate per 100,000 population was:

For 1913	25.7
„ 1922	31.7
„ 1923	10.0
„ 1924	12.4
„ 1925 (January to June)	4.4

The mortality during the famine was low—only 4.5 per cent. Leningrad was formerly one of the worst of the large cities of the world for typhoid fever owing to its poor filtration system. Its rate in 1910 was 33.7, while that of the largest cities in America was 23.5, and in thirty-three large European cities it was only 6.5. Since the advent of the Soviet Government the chlorinization system of some of the cities has been greatly improved, and the rate reduced in spite of the inefficient and worn-out sewage and filtration systems. For example, in Leningrad the rate decreased from 45.2 for the ten years preceding 1916 to approximately 20 since 1916, and for 1924 the rate was 14.6. The vaccination of two million people by the American Relief Administration and subsequent vaccinations by the Soviet Government may have helped.*

Cholera.

Cholera reached its maximum in 1921, when 205,000 cases were reported, and the actual number was many times this. There were 93,232 in 1922, 159 in 1923, only 10 in 1924, and 9 in the first six months of 1925 (Dobreitzer). Beeuwkes says: "The recurrence of cholera has increased in the past years, the intervals have become shorter, and the virulence has augmented." Altogether there have been eight epidemics in Russia since 1823. That of 1908 was much smaller than the recent one, although there were 200,000 cases. The mortality in 1908 was 59 per cent., in 1911 and 1915, when there were only a few cases, 48 and 27 per cent. respectively, and for the first three and a half months of 1921, according to Dr. Beeuwkes, 50 per cent. (A.R.A. Reports.) Transportation formerly was from India and Persia, but it is not known how the present epidemic arrived. Professor Jakoleff says (personal communication) that the organisms probably lie dormant in healthy carriers between epidemics, as they have been found in man in the South of Russia, and also in fish of the Caspian Sea. During the epidemic which coincided with the famine of 1892 the number of people who died of cholera (Hiss and Zinsser) was 800,000.

It is difficult to form an opinion as to how far the present epidemic was influenced by the six million vaccinations done in two million people (by the American Relief Administration) in 1922-23 with the Pasteur "tetra-vaccine" against typhoid, paratyphoid (A and B), and cholera. It is interesting to know that in this large number of cases not a single death was reported from the use of the vaccine, although there were some extremely severe reactions.[8] Castellani and Mendelson also had no untoward results in 170,000 Serbians who were similarly inoculated.[9]

Small-pox.

Small-pox has always been serious in Russia, as there was no compulsory vaccination before the revolution. Only in 1919 was there a marked increase in the disease. The official figures given below should be multiplied by two or more during the famine years.

1914 ...	... 94,000	1921 ...	... 83,000
1918 ...	... 57,000	1923 ...	... 40,000
1919 ...	... 166,000	1924 ...	... 28,553
1920 ...	... 98,000		

The rates (per 10,000 population) were: 4.1 for 1913, 3.6 for 1923, and 2.1 for 1924. Since 1918 the mortality has been 10 to 20 per cent. The Soviet Government has made vaccination compulsory (decree of 1919), and now

* In the city of Petrograd alone, in the three years 1918-20, there were registered in the hospitals 75,000 cases of typhus fever, and 25,000 cases of recurrent fever, or one-sixth to one-eighth of the population.

* In the above discussion paratyphoid has been included with typhoid as there were no accurate methods of distinguishing the two. Statistics for Russia are from Jakoleff, Dobreitzer and Chernorousky, and "Statburo."

Table II.—*Population.*

	1800.		1910.
Great Britain	16,000,000	.....	44,000,000
France	27,000,000	.....	39,000,000
Italy	17,000,000	.....	34,000,000
Sweden	2,000,000	.....	5,000,000

A decline in death rate has taken place also in the decade 1914-24, except in Russia. However, in 1918-19, in practically every country for which we have any record the death rate equalled or exceeded the birth rate, owing to the pandemic of influenza. Although racial and other conditions affect the birth rate, it has been also influenced in Europe by the disastrous circumstances following the war, and in America by increased standard of living and of economic pretensions.

Famine and Deficiency Diseases.

In addition to the underfeeding of the poor and the general lack of vitamins always present in civilized nations, there was during the world war, in nearly all the combating countries, a widespread caloric deficiency, especially marked in proteins, fats, and milk. In Berlin, in 1917, the rations fell to 1,400 calories.[4] In America this shortage lasted only one or two years, and to a very limited extent, but in Europe for a much longer time, and in Russia—the Capital of Famine—until 1924, and affected nearly everyone; at one time about 20,000,000 were starving, and in 1920-22 about 10,000,000 died from starvation.

Food Shortage in Russia.

In order to explain the nutritional and other diseases which arose during the famine period I shall give a few details concerning the food shortage. This deficiency began in 1915. After the Soviet revolution in 1917 people in the cities were rationed, and there was little possibility of buying more food as money was abolished and barter prohibited until September, 1921. After this famine reigned. The official ration for the civil population of Leningrad in 1918, 1919, and 1920 is given by a professor of medicine as follows: from 272 to 611 calories, depending upon the employment. The Red soldier who was not in active service was then receiving 1,467.6 calories instead of the normal 4,300. In 1921 the civil ration was raised to 1,500 calories, with a proportion of 75 per cent. carbohydrates, 17 per cent. proteins, and 8 per cent. fats. The quality was poor, consisting mainly of coarse black bread, salt herring, and potatoes, and later of grits made of millet. Salt as an article of diet was absent.

Results of the Famine.

A leading internist of Leningrad gives the following as results of the famine: (1) General loss of weight of 20 to 40 per cent., and the entire disappearance of fat people. (2) Decrease in the capacity for mental work and a decrease in mental activity manifested by apathy, inability to concentrate, impairment of memory, weakness of will, a dulling of the feelings, especially of compassion, love, and the desire to be clean. (3) The development of the famine diseases, "hunger oedema" and "hunger cachexia." These showed a mortality of 50 per cent. (4) The increase in deficiency diseases such as scurvy, noma, and rickets. (5) The increase in some gastro-intestinal diseases—as meteorism, peptic ulcer, acute colitis, and occlusions caused by the indigestible food. These will be discussed under Internal Diseases. (6) Anthropological changes (to be discussed later).

The following is another description of famine disease which I have abstracted from an unpublished account given me by Professor Chernorousky of the Leningrad Medical Institute:

Marked insufficiency of food lasting for a long time caused rapid loss of weight and splanchnoptosis. When this loss reached a certain degree it resulted in a definite disease—"famine inanition." Typical early symptoms were decrease of sexual activity; in men decrease of libido and impotentia, and in women amenorrhoea; a relaxation of sphincters, particularly of the bladder, causing a frequent desire to micturate.

Further decrease of nutrition led to a non-albuminous oedema, characterized by weakness, apathy, subnormal temperature, bradycardia, anaemia, and polyuria. There was disturbance of metabolism and an alteration of the capacity of the tissues to retain water.

Famine disease which was not accompanied by oedema ("famine cachexia") showed more pronounced nervous symptoms, and its course was more acute and serious. Professor Chernorousky concludes that the oedema has a compensatory value.

Gastro-intestinal Disorders.

The change in the nutritional conditions (decrease in proteins and fats, relative increase in carbohydrates, and great increase of indigestible residue) resulted in traumata of the gastro-intestinal tract, and a marked increase in hyperacidity and hypersecretion and gastric and duodenal ulcers; on the other hand, there was a decrease in gastritis, appendicitis, and constipation.

Scurvy.

Scurvy was one of the deficiency diseases least affected by the famine. It was more often seen in hospitals and kitchens where the inmates received a fairly ample caloric ration than in those in whom starvation was more marked but who were not confined to an institution. This was probably because they satisfied their appetite by eating berries, bark, leaves, etc. Scurvy was sometimes seen in the American kitchens where the children received cocoa, sugar, white bread, and evaporated milk.

Noma: Rickets: Pyorrhoea.

Noma increased enormously during the famine, and this was thought to be due to an abrasion resulting from coarse food (as wheat chaff) in a debilitated person. In a hospital at Syzran on the Volga which I inspected in 1922, 20 per cent. of the children had noma. It was always fatal. During the famine period 80 per cent. of the children were said to have rickets. In 1926 it is less prevalent, though still above the pre-war rate. This disease had also increased eightfold in Germany between 1916 and 1923. In Russia I did not see or hear of the keratomalacia and blindness which were present in Germany, owing to the food deficiency, in 1923. Pyorrhoea, which is so common in America, is rarer in Russia, although it has increased markedly in the past few years.

At the present time all these deficiency diseases have practically disappeared, and the feeding conditions are back to what is normal for Russia.

Acute Infectious Diseases.

Typhus and Relapsing Fever.

The lice- and insect-borne diseases, such as typhus and relapsing fever, and plague had practically disappeared from the earth except as endemics until the world war. With the squalor and malnutrition following the war the first two of these diseases assumed epidemic proportions in Eastern and Central Europe. Even in such ordinarily well ordered countries as Germany and Finland there were epidemics of significant size in 1917-19—for example, there were over 3,000 cases of typhus in Germany in 1919.[5] In Poland these epidemics were of enormous size, and in Russia, where lice were universal, practically everyone who was not immune was attacked (35,000,000 cases of typhus and relapsing fever together in Russia followed the world war).

Wherever there is constant dirt, lice, and overcrowding, typhus is likely to be present (for example, New York, Ireland, China, India). When these conditions become universal the disease spreads from an endemic into an epidemic. War furnishes ideal conditions for its spread. Sir Humphry Rolleston, former Surgeon Rear-Admiral in the British Navy, says:

> "War, by massing together in close quarters large numbers of men, and especially of young recruits, facilitates the spread of infection, and thus fevers which in peace are endemic or sporadic become epidemic; this has been the universal experience, as was shown in the case of typhoid fever in the South African war, of typhus in Serbia, and of paratyphoid and, to a lesser extent, of cerebro-spinal fever among our own men during the present campaign."

Famine also has some effect on the spread of these epidemics. It has often been noticed in Russia that they coincided with famine years. In the recent famine the incidence of the epidemics was remarkably greater in those

1913. The following figures for other years have been furnished through the courtesy of Professor S. A. Novosilsky of the "Statburo," Leningrad:

1881-85	54.8	1920	55.7
1909-13	36.9	1921	38.5
1917	36.8	1922	41.0
1918	38.6	1923	29.8
1919	48.0		

Current reports indicate that, although the death rate is lower, the disease is yet very prevalent. For example, in the universities where systematic examinations have been made, we get active tuberculosis in: Odessa, March, 1923, 6.9 per cent. of all university students; Kiev, November, 1923, 12 per cent. of all students; in 1924 another report, testified as to its accuracy by leading physicians there, gives 47 per cent. of the students.*

Syphilis.

Not only during the war, but for the years immediately following, syphilis increased all over the civilized world, in neutral as well as in combatant nations—for example, Sweden and Denmark.† In Germany in 1923, according to Möller, syphilis had increased 20 per cent., or 100 per cent. between the ages of 18 and 25 since 1919.

In Russia there was not only every social reason why syphilis should increase, but another important one absent in other countries—the lack of means of treatment: there were no arsenicals and few institutes. Overcrowding and filth contributed their share toward the increase. Under such conditions (the augmented chances of infection and the lack of treatment) syphilis mounted until in 1922 Dr. Semashko said that 80 per cent. of the population was infected in some sections (L. H. Guest). In 1923 doctors from north-western Russia reported to me that 95 per cent. of the population of their districts were syphilitic and the available supply of arsphenamine was far too small. In the same year the disease was so prevalent that I saw many who had been infected other than by sexual means—primary lesions in the nose, etc., whole families infected by ordinary contact under the extreme conditions of filth.

In 1920-22 there were officially registered in Leningrad institutes nearly 12 per cent. of the total population as having venereal disease, one-third of which (that is, 4 per cent. of the total population) were syphilitic. The actual number of cases must have been considerably greater. During these three years arsenicals were given to only 5 per cent. of the cases registered.

Present reports indicate that syphilis has decreased since 1923. In the autumn of 1925 Dr. Semashko, Commissar of Health, told me that although syphilis had greatly decreased throughout Russia there were yet some places where 80 per cent. of the people were infected. Where systematic examinations have been made the figures are very low. Dr. Semashko says:

> "An examination of 70,000 Red soldiers gave 0.4 per cent. syphilis and 0.7 per cent. gonorrhoea in Moscow, and 0.9 per cent. syphilis and 2.0 per cent. gonorrhoea in Leningrad, at the moment of examination; of 1,600 university students of Moscow, 1.2 per cent. syphilis; of Moscow workers, 1.5 per cent. syphilis, 20 per cent. gonorrhoea; of some of the worst villages, 12 per cent. syphilis."

The examination of whole student bodies gave: in Odessa in March, 1923, 1.9 per cent. of the total as venereal; in Kiev in November, 1923, 12 per cent. of the total as venereal, one-tenth of which (1.2 per cent.) were syphilitic. The proportion of women to men was 1 to 6. In American universities 5 per cent. of the total are said to be syphilitic, and 20 per cent. of those that enlist in the regular army (M. J. Rosenau). At the Soviet sanatoriums in the Caucasian Mountains the chief of the department (Dr. Kishkin) told me that 1.1 per cent. of the 20,000 patients there in 1925 were found syphilitic. These low Russian figures can probably be explained by the difference in the methods of examination, such as the omission of the Wassermann test, etc.

It is interesting to note in connexion with the treatment of general paralysis by malarial infection that Russian psychiatrists have reported that there has been no decrease in this disease, although malaria has increased several fold.

An analysis of several thousand cases of syphilis at the Nachinson Hospital, Leningrad (April to September, 1925), gives the following[12]: Most of the cases were between 20 and 30 years; 52 per cent. were married. Only a small number were from the educated classes—6 per cent. had an average education, and 0.3 per cent. a higher education. Twice as many women as men contracted the disease innocently. Many answered that they received the infection from sisters, brothers, daughters, or friends, but 87 per cent. of the men admitted infection from prostitutes; 24 per cent. contracted the ailment while drunk. Most of the men said that they began to go with prostitutes at the age of 16, and that they began to have sexual intercourse when 9 years old.

* From reports furnished by Mr. O. J. Frederiksen of the European Student Relief.

† Competent physicians in Sweden told me that they attributed this to increased movements of the population, increase of industrial life, etc., occasioned by the war.

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Reviews.

CHRONIC RHEUMATIC DISEASES.

Long famous for the treatment of arthritic affections, Bath has been fortunate in its medical authors, such as John Haygarth (nodosities), William Falconer, Caleb Hillier Parry, and J. K. Spender, to mention a few only of those who have enriched medical knowledge by the records of their experience. That the present medical generation of this ancient spa have not rested on their oars is shown by their recent contributions to our pages and to other publications, and now the last year's President of the British Medical Association, Dr. F. G. Thomson, and his colleague Dr. R. G. Gordon in *Chronic Rheumatic Diseases: Their Diagnosis and Treatment*[1] have brought out a well written and thoroughly practical summary of a subject which has been so much discussed that it is sometimes rather difficult to see the wood for the trees. This compact and clearly expressed handbook is divided into three parts, dealing with the clinical aspects, the common mistakes in diagnosis, and the principles of treatment respectively. In a brief summary of the etiological factors, the authors, while giving full weight to infection, set before the reader the reasons for considering that diathesis and personal idiosyncrasies play a disposing part; they also consider that primary osteo-arthritis is entirely due to strain and malnutrition of the joint.

While not attempting a scientific classification, for which the time has hardly arrived, the authors present a series of clinical pictures, including fibrositis, lumbago, sciatica, periarticular fibrositis, focal arthritis, osteo-arthritis, spondylitis, climacteric arthritis, and gout. The much used, and somewhat abused because vaguely used, term "chronic rheumatoid arthritis" is dropped, and for much of what it has covered "focal arthritis" is substituted, and may be welcomed as a reminder that the responsible site of infection must be sought and removed. This point is rightly emphasized, as is the futility of wasting time on palliative treatment, such as drugs and local applications. After removal of the causal focus the most efficient form of medication is said to be the freshly made chlorine mixture, which the late Burney Yeo recommended in the treatment of typhoid fever, other reputed intestinal anti-

[1] *Chronic Rheumatic Diseases: Their Diagnosis and Treatment.* By F. G. Thomson, M.A.Cantab., M.D., F.R.C.P.Lond., and R. G. Gordon, M.D., D.Sc., M.R.C.P.Edin. Oxford Medical Publications. London: Humphrey Milford, Oxford University Press. 1926. (Demy 8vo, pp. viii +202. 8s. 6d. net.)

that it is manufacturing its own vaccines (in 1922 two million children were vaccinated by the A.R.A.) we may look forward to this disease being reduced to the limits of other civilized countries.

Dysentery.

With dysentery, as with typhoid and small-pox, there was no great increase during the famine and war years. The figures for the morbidity of this disease were:

1913 ...	... 445,955	1921 ...	... 197,000
1918 ...	... 59,000	1922 ...	... 365,691
1919 ...	... 137,000	1923 ...	... 239,231
1920 ...	... 324,000	1924 ...	... 338,567

The rates (per 10,000) were: 30.5 for 1913, 29.7 for 1922, 17.9 for 1923, 25.2 for 1924.* In spite of there having been no marked change in morbidity, the mortality increased sharply after 1918, which was attributed to the famine and the quality of the food. In 1919 the mortality was 20 per cent., and in 1920-21 it was 63 to 70 per cent. The prognosis of patients with typhus was especially poor (Chernorousky). The usual type was the Flexner; the Shiga type was rarer, and the amoebic was found only in the South of Russia, where there were many cases of hepatic abscess. In the treatment of the bacillary form excellent results were obtained with Lister Institute serum; but the Pasteur serum was of little value. Even better results were obtained from the vaccine treatment than from serum.

Summary.

To sum up the situation in regard to infectious epidemics, we can say that the epidemics of typhus and relapsing fever which coincided with the famine were probably the largest ever seen in Russia, that the cholera epidemic was exceeded only by that of 1892, and that the malaria epidemic which followed the famine was decidedly the largest of its kind on record in Russia. Small-pox was slightly increased during the first year of the famine, but typhoid decreased. There was a small epidemic of even the plague during the famine. Since 1922 all of these infectious diseases have markedly decreased, except malaria and children's infections, which have increased. In 1924 there were 2,198 cases of epidemic encephalitis as against 958 in 1923.[10]

MALARIA.

Epidemics of malaria, syphilis, and tuberculosis have followed on the heels of the deadly typhus, and they remain problems of the present Russia.

Malaria had always been prevalent—for example, in 1914 there were reported 3,170,547 cases; but in 1922 the disease spread over the whole of Russia, even to Archangel and Murmansk on the shores of the Arctic, where it had hardly been known before, and indeed the tropical form was seen so far north. The peak of the epidemic was reached in 1923, when over six million cases were registered, and this probably represents only one-third of the actual number. Whole villages in the south and on the Volga were stricken. The average number of cases per 10,000 was 216 in 1913, 474 in 1923, 421 in 1924, and 175 in the first six months of 1925 (Dobreitzer). For thirty-eight years preceding the war the cases in the Moscow district numbered 80.5 per 10,000; the rate was 258 in 1921, and 600 in 1923, according to official reports. In Vologda, between Leningrad and Archangel (latitude 60° N.), 72 per cent. of the workmen of the Water Traffic there suffered from malaria; in Archangel before the war there were 10 cases per 10,000, and in 1923 410 per 10,000. The tropical form was much more common in the south than in the north (Siberia 1.5 per cent., Middle Volga 25 per cent., Caucasus 50 per cent., and along the Caspian 80 per cent. in 1923). The mortality was extremely high where the tropical forms were present; "in the absence of quinine and other methods of treatment it is even said to amount to 40 per cent. in some places."[11]

This unprecedented spread of malaria was probably brought about by the constant movement of enormous masses of people and hordes of refugees during the war, revolution and famine, and the lack of quinine and medical personnel. Several Russian authors mention, as additional factors, the general lack of sanitation, the destruction of drainage systems, and the decrease of cattle and tillage of the soil. Previous epidemics occurred in 1894, 1899, 1903, and 1908, but on a smaller scale. Each epidemic has come in the years immediately following famine, but not during the famine.

Characteristics of the Present Epidemic.

Dr. I. A. Dobreitzer, in the Pan-Russian Congress of January, 1924, pointed out the following interesting facts. Before the war the highest incidence was in spring, after the war in September; a high autumnal incidence indicates malaria for the ensuing year. Anopheles has been found in the past few years on the shores of the Arctic, and in the Caucasian Mountains, 6,500 feet above sea-level, and it lives during the winter in the houses of the peasants. Sixty per cent. of the cases have occurred between the ages of 18 and 60 years. A large number of infants have recently been seen with malaria (in Samara 30 per cent., and in some institutes of Moscow and of Turkestan 80 per cent. of the total number of infants observed). During 1924 and the first seven months of 1925 malaria had receded somewhat from its peak of 1923, but when I was along the Volga in the autumn of 1925 tropical malaria was again spreading rapidly. In Saratov Professor Kusheff of the Malarial Station told me that malaria had then mounted during three weeks to equal its former highest record (1923), and that 80 per cent. of the cases were tropical—an alarming situation.

Of 5,322 malarial patients examined in the Leningrad district in 1921 the spleen was markedly enlarged in 5.6 per cent. Where the disease is endemic the spleen is said to be enlarged in a greater percentage of children than of adults, but here the reverse was true, for only 1.6 per cent. of the children showed marked enlargement (A. P. Zelheim).

Treatment.

In the pernicious forms excellent results were obtained by large intravenous doses of quinine hydrochloride (1 to 2 grams) repeated for two or three doses on successive days. Even advanced cases yielded to this treatment (Dobrotin). The disease was nearly always fatal when treated by the mouth. After intravenous injection the spleen often returned to normal in one or two days. In 1922 Dr. A. N. Dobrotin in Saratov showed me such a case; in a girl aged 12 with the pernicious form the spleen reached to the umbilicus, but three days after the first intravenous dose it was reduced to normal. Professor N. E. Kusheff, however, limits the intravenous method to the comatose forms, as death may rarely occur from its employment. He uses the following as a hypodermic injection:

℞ Quinine bicholor. ... ... 10 gm.
Methylene blue (Merck) ... ... 0.6 gm.
Aq. dest. q.s. ... ... 40 gm.
M. et sig.: 2 gm. hypodermically q.d. for twelve days; for following month 1.8 gm. per os.

TUBERCULOSIS.

Tuberculosis was increased in all the combatant nations of Europe during and after the war. The peak of the curve was reached in England in 1918 (17.3 deaths per 10,000, compared with 13.6 in 1914); in Germany in 1918 (23.0, compared with 14.3 in 1914); in Austria in 1917 (43.2, compared with 25.9 in 1913); in Petrograd in 1920 (55.2, compared with 33.5 in 1913). The fact that such countries as Switzerland and Sweden have shown a more constant death rate for the past decade puts the blame more on the conditions of war than on the influenza pandemic.

The extreme conditions of life caused a dying off of all chronics. This removal of the most susceptible was naturally followed by a low death rate from tuberculosis in most of the countries where the death rate had been unusually high, notably in Germany and Russia. Thus in Leningrad, which we may take as an index for Russia, the rate has fallen gradually to 26.9 in 1924—lower than in

* Sir Humphry Rolleston points out that of the soldiers landing at Plymouth during the war, diagnosed as dysentery, 71 per cent. were either typhoid or paratyphoid; the same error may have existed in Russia, but it seems improbable that it has affected the figures as a whole. For if we consider those figures in connexion with those for typhoid, we see that there has been very little change in either series. (*Practitioner*, January, 1916.)

a very clear account of the salient facts that have been established. It is doubtful if anyone else could have summarized this difficult subject so shortly, simply, and yet so accurately. A considerable proportion of the volume deals with the interpretation of experimental results obtained by the author and his pupils.

All persons interested in the colloidal chemistry of protoplasm will find this book extraordinarily interesting and suggestive.

THE PEAKS OF MEDICAL HISTORY.

IN his attractive outline of the evolution of medicine entitled *The Peaks of Medical History*,[5] dedicated to Lieut.-Colonel Fielding H. Garrison, Professor C. L. DANA of New York divides the history of medicine into seven periods—the pre-Hippocratic, the Hippocratic, the Alexandrian, the Galenic and post-Galenic, the Renaissance, the sixth of theories and speculations, ending with Jenner (1800), and the seventh of modern medicine down to the middle of the last century, the six peaks being Hippocrates, Alexandrian medicine, and so on. The oaths of the Hindu physician and of Hippocrates are printed, and the work is liberally and artistically illustrated; among the pictures is a rubbing from the breastplate of the leaden sarcophagus containing the remains of William Harvey in the vault of the church at Hempstead, made in 1880 by the late Weir Mitchell.

In a small space the volume contains a pleasant account of the great men of old, but the chapter on modern medicine, which is the most difficult to view in proper perspective, is perhaps the least attractive and certainly is the one most easy to criticize. Like all the works on medical history issued by the house of Hoeber, it is admirably got up.

"BRAIN."

THE issue of *Brain* for July (vol. xlix, Part 2)[6] contains a paper on combined disease of the pyramidal and extrapyramidal systems, with special reference to a new syndrome, by Professor Lhermitte and Dr. Douglas McAlpine, from the Laboratory of Neuro-Pathology, University of Paris. A clinical and pathological account is given of a case showing a degree of spastic paralysis with extensor plantar responses, which in the later stages developed choreiform movements and rigidity of extrapyramidal type. This is followed by a review of the literature and a discussion of the pathological basis of choreiform movements. Professor Leonard S. Dudgeon and Dr. A. L. Urquhart describe an investigation of the viscera and muscles in nine cases of exophthalmic goitre. In eight they found in various muscles, chiefly the ocular muscles, lymphorrhages, exactly similar to those found in myasthenia gravis. They consisted of collections of lymphocytes with some plasma cells and endothelial cells, separating the muscle fibres; in some cases the neighbouring muscle fibres showed atrophic or inflammatory changes.

Dr. O. M. Duthie, of the anatomy department of Manchester University, records some observations on deep sensibility in continuation of the work of Professor Stopford. He examined the sensibility of twenty patients suffering from division of tendons in the forearm uncomplicated by lesions of peripheral nerve trunks. He concludes that division of nerve fibres proceeding along tendons results in only slight loss of deep sensibility, tactile pressure being chiefly affected. Drs. Henry W. Woltman and Alfred W. Adson, of the Mayo Clinic, record a case of abscess of the spinal cord which made a remarkable recovery after operation, and give a valuable summary of the literature of this rare condition.

Drs. Curt P. Richter and Leo Henry Bartemeier, of the Johns Hopkins Hospital, contribute an important paper on decerebrate rigidity of the sloth. They selected this animal because its normal posture at rest and during progression is a hanging one—that is, the opposite of the attitude of quadrupeds such as were employed by Sherrington in his experiments on decerebrate rigidity. They establish the interesting fact that the decerebrate sloth exhibits reflex hanging, thus bringing decerebrate rigidity into relation with normal posture. They draw some conclusions respecting the probable clinical counterpart of decerebrate rigidity in man.

GUY'S HOSPITAL REPORTS.

THE second quarterly instalment of the 76th volume of the *Guy's Hospital Reports*[7] opens with an obituary notice of Dr. G. H. Hunt by the Editor, who gives an account of the large amount of work his late colleague had accomplished in a comparatively short time. Dr. J. M. H. Campbell has expanded into an article the late Dr. Hunt's notes on heart disease and pregnancy based on 156 cases, which show that, provided the heart is not enlarged, mitral disease does not add much risk; when, however, there is cardiac enlargement the degree of risk depends on the amount of enlargement, and in auricular fibrillation the results are so serious that pregnancy should be prohibited. Dr. G. W. Rake describes a case of annular muscular hypertrophy of the oesophagus and shows good reason for his view that it is compensated achalasia of the cardia without dilatation. A curious point in Mr. W. E. Tanner's record of a case of dysphagia due to a posterior pharyngo-oesophageal pouch was the absence of any fetor of the breath, due, as is supposed, to the fact that the patient's addiction to neat whisky kept the pouch clean. Four short records of the association of chronic duodenal ileus with gastric and duodenal ulcer by the Editor and his colleagues are followed by a discussion of the indications for enterostomy and its technique by Mr. R. P. Rowlands. In recording a case of chronic volvulus of the pelvic colon simulating pyloric obstruction but correctly diagnosed by radiological methods before its successful excision, Dr. Hurst refers to Sir Arbuthnot Lane's demonstration that a volvulus is only the terminal stage of a condition which usually takes years to develop. Dr. F. A. Knott's experimental researches suggest that salicylates taken by the mouth exert hardly any antiseptic action on the bile; accepting Cartier's observations as to their strongly cholagogue action, they confirm Chauffard's view that salicylates alone are chiefly of use in non-infective cholecystitis and that hexamine should be added when infection is known or suspected to be present. About half of the number is occupied by the ninth of Dr. G. W. Nicholson's studies on tumour formation; it deals fully with endometriomas, though he modestly says that he has "only skimmed" the subject, the weary "length of which has dragged itself to rest."

NOTES ON BOOKS.

DR. OSKAR TEICHMAN has compiled an interesting little book on *The Cambridge Undergraduate 100 Years Ago*.[8] His information is derived from sundry Cambridge publications of the period. Thus in 1823 a little book of poems and epigrams, called the *Cambridge Tart*, was published as a counterblast to the *Oxford Sausage*. From this anthology we learn that the dean of those days used to set impositions of a hundred lines of Homer for non-attendance at chapel; that the barber was on the college foundation like the cook, and had his shop inside the gates; that undergraduates attended hall at 3 or 4 o'clock in the afternoon in breeches and gaiters, subsequently retiring to a wine party and ending the evening with something hot. In the meantime the Fellows spent a couple of hours in the combination room, and if still more or less sober finished the evening with beakers of brandy. From time to time the undergraduate's life was enlivened by town and gown conflicts; and a particularly stirring attack by

[5] *The Peaks of Medical History: An Outline of the Evolution of Medicine for the Use of Medical Students and Practitioners.* By Charles L. Dana, A.M., M.D., LL.D. New York: Paul B. Hoeber, Inc. 1926. (6 × 9, pp. 105; 40 plates and 16 illustrations in the text. 3 dollars net.)

[6] Published in London by Macmillan and Co., and in New York by the Macmillan Company. Yearly subscription in this country 24s., to be sent to Messrs. Macmillan, St. Martin's Street, London, W.C.2. Price of this part 6s. net.

[7] *Guy's Hospital Reports.* Vol. 76 (Vol. 6, Fourth Series), No. 2, April, 1926. Edited by A. F. Hurst, M.D. London: Wakley and Son (1912), Ltd. (Med. 8vo, pp. 127-252; 6 plates, 20 figures. Annual subscription, £2 2s.; single numbers 12s. 6d. net.)

[8] *The Cambridge Undergraduate 100 Years Ago.* Compiled, with extracts and illustrations from contemporary sources, by Oskar Teichman, D.S.O., M.C., M.A. Cambridge: W. Heffer and Sons, Ltd. 1926. (Cr. 8vo, pp. vii + 108; illustrated. 4s. net.)

septics, with the exception of mercurial preparations, particularly in gout, being dismissed as "singularly ineffective." Climacteric arthritis, which is held to be chiefly of metabolic rather than of infective or degenerative origin, is described as a special and definite form, which usually begins in stoutish women about the time of the menopause, and is implanted on thyroid insufficiency, thus contrasting with focal arthritis, which is often associated with symptoms of hyperthyroidism. Early treatment is very successful, and consists in reduction of excessive weight, detoxication and improvement of the general tone, and the correction of endocrine deficiency.

The authors' apology for a certain amount of repetition, which is almost inevitable and sometimes useful, and for some degree of dogmatism, which the general practitioner, for whom the work is intended, will probably welcome, forestalls any possible criticism; indeed, there is none to make. The last section, on the principles of treatment, shows sound common sense, good judgement, and an entire absence of any tendency unduly to insist on the undeniable claims of Bath as a remedial spa.

THOMSON'S "DISEASES OF THE NOSE AND THROAT."

IN presenting a copy to the reviewer, Sir STCLAIR THOMSON inscribed as follows on the fly-leaf of his new edition[2] of *Diseases of the Nose and Throat*: "George III to Gibbon the historian: 'Another damned fat book, Mr. Gibbon! Scribble, scribble, scribble, eh, Mr. Gibbon?'" The author can well afford the jest against himself because there is here neither scribbling nor obesity, and though the third edition is larger than either its father or its grandfather, the increase is due to the natural expansion, both intrinsic and extrinsic, of the subjects treated. There is good reason to believe that had it not been for the inflexible opposition of the publishers the grandchild might have turned the scale a few more ounces still. Externally the new edition is shown by a change of colour from the familiar blue to green—not the dingy green of an old blue suit, but a placid shade indicating a green and vigorous old age.

The oesophagus, certain diseases of the nose, cocaine substitutes, and malignant disease of the larynx represent some of the more important items calling for revision and extension. An instance which shows the changing point of view is tonsillotomy, which at least received recognition in the first edition. In the second its funeral oration was pronounced, and in the third it has been decently interred. Although the author only refers in the preface to a few changes and additions it will be found that nearly every section has undergone some alteration, always with advantage.

It is a common experience to find that a writer, especially a medical writer, has exhausted all he has to say in a first edition and that later additions only result in a scrap-book. There is no such patchwork effect here. Fresh work has been introduced and sections rewritten with such skill that a perfect blend results. The art is only revealed by the dates of the references, which as before adorn the pages in profusion, and it is right to say here that Sir StClair Thomson has been particularly generous in acknowledging the efforts of his younger colleagues.

It was stated dogmatically in the review of the first edition that this is the best book of its kind in the English language, and there is every reason to ratify that opinion now, fifteen years later. It is therefore refreshing to find that the author betrays his humanity by an occasional slip of the pen, albeit they are of a nature that could mislead nobody. A single example is enough: he takes some trouble to make it clear that mucous polypi of the nose are not new growths, and in almost the next paragraph refers to them as neoplasms.

It may be permissible to conclude these remarks with a text from Edward Gibbon, whose name adorns the opening; Gibbon wrote: "The sophist of Antioch professes to admire the moderation of Sapor in contenting himself with so small a portion of the Roman Empire." If Sir StClair Thomson has contented himself with a small portion of the empire of the human body, he has cultivated the study of it in a manner that may well excite admiration, and he has truly achieved his openly avowed intention of making a good book into a still better book.

[2] *Diseases of the Nose and Throat, Comprising Affections of the Trachea and Oesophagus.* By Sir StClair Thomson, M.D., F.R.C.P.Lond., F.R.C.S.Eng. Third edition. London: Cassell and Co., Ltd. 1926. (Med. 8vo, pp. xvi + 943; 379 figures, 12 colour and 12 black and white plates. 45s. net.)

MEDICAL PATHOLOGY.

THE *Précis* of medical pathology by Drs. F. BEZANÇON and A. PHILIBERT is the work of several authors, and is ultimately to consist of seven volumes. So far only two have been published.[3] The first treats of the common infectious diseases, and the second of diseases caused by spirochaetes, filterable viruses, and protozoa, of diseases whose cause is as yet unknown, of cancer, and of the intoxications. Pathology and morbid anatomy play only a small part in the composition of the work, which is in reality a textbook of medicine; indeed, far greater stress is laid on the clinical than on the laboratory side of the subject. For this reason it is not unnatural to find that the bacteriology, in particular, is poorly done, and is spoiled by the inclusion of a number of erroneous or unconfirmed statements, and by the omission of some well substantiated facts.

It is curious to find it said in the discussion of the diagnosis of enteric fever that a titre of 1/100 to *B. typhosus* or of 1/500 to *B. paratyphosus* B is significant, without the mention of the reactions encountered in inoculated persons, or the necessity of following the agglutination curve in doubtful cases. With such teaching as this it is not to be wondered at that mistakes in diagnosis are said to be not uncommon. Recently we had a striking example of this in the case of an officer living in Paris, who, on the basis of a Widal reaction, was told that he was suffering from typhoid fever; he—wisely as it turned out—hurried over to this country, only to find on a thorough investigation that the agglutinins in his blood were entirely referable to his previous inoculation with T.A.B. vaccine.

The classification of diseases adopted is not free from objection; dengue and trench fever are included under the spirochaetoses, whereas a disease such as spirochaetosis icterohaemorrhagica, of whose etiology there is no doubt, is omitted altogether. Scarlet fever is placed amongst the diseases of unknown origin; for this a reasonable case might be made out, but for the statement that the streptococci of scarlatina are identical with those from other sources there is no justification.

Some of the illustrations are poor and even misleading, but the book is well written and eminently readable. We doubt, however, if it is likely to find favour in this country.

THE CHEMISTRY OF PROTOPLASM.

The Effects of Ions in Colloidal Systems,[4] by Professor L. MICHAELIS of Baltimore, contains the substance of various lectures given by him last year at certain American universities.

The application of the laws of physical chemistry to living protoplasm is one of the most difficult of the problems that at present confront physiology. The theoretically correct course would be for the chemists to enunciate the laws and the biologists to seek to apply them. In actual practice the biologists have had in many cases to establish physico-chemical laws to explain the phenomena observed in living matter. Professor Michaelis in particular has rendered outstanding service in helping to clarify the confused question of the fundamental nature of the process of adsorption. He apologizes in the preface for the fact that his book deals more with physical chemistry than with physiology, but points out that the biologists' problems are so complex that they are forced to help to organize certain branches of chemistry and physics which are most likely to be of service to physiology.

The book deals with the fundamental nature of the process of the adsorption of ions by colloidal systems. This problem is still very largely unsolved, but the author gives

[3] *Précis de Pathologie Médicale.* Tomes I et II; Maladies Infectieuses. Par Fernand Bezançon et André Philibert. Paris: Masson et Cie. 1926. (Cr. 8vo. Tome I: pp. 539; 75 figures. Tome II: pp. 646; 91 figures. 28 fr.; bound, 34 fr. a volume.)

[4] *The Effects of Ions in Colloidal Systems.* By Dr. Leonor Michaelis. Baltimore: The Williams and Wilkins Company; London: Baillière, Tindall and Cox. 1925. (Cr. 8vo, pp. 108; 7 figures. 12s. 6d. net.)

British Medical Journal.

SATURDAY, AUGUST 14TH, 1926.

A HARVEIAN TERCENTENARY.

AT its last meeting the Royal College of Physicians of London resolved duly to celebrate in 1928 the tercentenary of the first publication of Harvey's *De Motu Cordis*. This decision is amply justified by the importance of the occasion. Harvey's investigation into the physiology of the circulation of the blood had, indeed, been brought to a successful conclusion nine years before the publication of this celebrated book, and the truth of his discoveries had been accepted by many of his colleagues. In his eloquent dedicatory letter to the President and Fellows he wrote: "Having now for nine years and more confirmed these views by multiplied demonstrations in your presence, illustrated them by arguments, and freed them from the objections of the most learned and skilful anatomists, I at length yield to the requests, I might say entreaties, of many, and here present them for general consideration in this treatise."[1]

The time was ripe for publication, and the dissemination of the truth all over the civilized world could no longer be delayed; the date of publication, and not that of the first statement of his views in the Lumleian Lectures, is necessarily that of which the tercentenary is to be honoured. We have referred to the importance of the occasion, and by this we intend to lay stress not only on the value of the great discovery to the future progress of medicine and surgery, but still more on the method by which the discovery was made. This has perhaps attracted less attention than its importance merits in the intellectual history of mankind. The end of the sixteenth and the beginning of the seventeenth centuries were astonishingly fertile in the production of men of great mental power, and of these our country is proud to claim a large share. Shakespeare, Reginald Scott, Bacon, and Harvey were to be closely followed by Hobbes, Locke, Hooke, and Newton, while among their contemporaries on the Continent were Galileo and Descartes, to name only the greatest. Reginald Scott, like Harvey a "man of Kent," stands out in the sixteenth century conspicuous for the modern spirit of his writings. His *Discoverie of Witchcraft*, published in 1584, in which he ridiculed and disproved the charges on which poor old women were sentenced to be burnt or drowned, was itself afterwards condemned to the flames by a demonologist king who had imported the practice of witch-baiting from Scotland. For a generation Scott had no successors. It is of interest to note that to Harvey in 1634 was committed the duty of examining four poor women known as the Lancashire witches. He found no devil's teats or other imagined horrors, and as a result of his report of their normality they were pardoned—for crimes of which they were guiltless.

Bacon's *Novum Organum* appeared in 1620 after a long incubation. In that immortal work the right use of the inductive and deductive methods of reasoning was set forth, and the importance of observation and experiment was insisted upon as a means of forming correct premisses, without which all conclusions must be unsound. Yet the old reproach, "Physician, heal thyself," might have been applied to Bacon, for in his last work, *Sylva Sylvarum*, he showed himself as credulous as his predecessors, and he rejected the Copernican theory. He was probably unaware of Harvey's discovery, for he died in 1626, and a comparison of dates shows that Harvey could not owe anything to the *Novum Organum*, yet no better example of the right use of the Baconian methods of reasoning could be produced than the treatise *De Motu Cordis et Sanguinis*.

After discussing the views then generally held as to the functions and action of the heart and the lungs and blood vessels, and showing how untenable they all were, Harvey describes his own investigations. He tells us that for the purposes of this research he had thoroughly dissected more than eighty species of animals—cold- as well as warm-blooded—and that at first in his vivisections he could not follow the sequence of events or understand the meaning of what was happening before his eyes, so that he "was not surprised that Andreas Laurentius should have said that the motion of the heart was as perplexing as the flux and reflux of Euripus had appeared to Aristotle." But "at length and by using greater and daily diligence, having frequent recourse to vivisections, employing a variety of animals for the purpose, and collating numerous observations, I thought that I had attained to the truth." All the world now knows that he did not deceive himself.

Although there seems no reason to doubt that the Fellows of the College of Physicians were convinced by his arguments and demonstrations, it is remarkable how little evidence of their conviction is to be found in contemporary medical literature, or for a good many years afterwards. In the works of Glisson, for instance, the weight of the heavy hand of Galenical authority is everywhere manifest, and nowhere in them do we find evidence that he had understood and accepted the newly found truths. Yet it might have been expected that a physician of the intelligence and originality of the author of the *Tractatus de Rachitide* would have eagerly absorbed and promulgated Harvey's views on the circulation. Sir Thomas Browne—who, it is true, was greater as a euphuist and man of letters than as a physician or natural philosopher—is silent on the subject. Had he understood and accepted Harvey's methods he could not have gravely discussed the question of why a badger has the legs on one side longer than those on the other without verifying his premiss by examining a specimen of that interesting animal, which must have been easily procurable at Norwich in his day. But *non omnia possumus omnes*, and had Browne devoted himself to observation and experiment we might have lost a charming writer without gaining a valuable man of science.

Harvey's later work, *De Generatione Animalium*, while it embodies a mass of accurate observations, could not in the nature of things be so fruitful in results as the earlier one. He had not the instruments which were necessary for the discovery of the ovum and the spermatozoon, and in his ignorance of their very existence he could not even guess at the parts played by them.

Among laymen, Dryden is one who pays a tribute to Harvey, but Cowley's ode is far more worthy of

[1] This and other quotations are from the Sydenham Society's translations of the works, by R. Willis, M.D. London, 1847.

500 gownsmen on 2,000 "snobs" after the acquittal of Queen Caroline was described in the *Gradus ad Cantabrigiam* in a parody of Campbell, beginning "On Granta, when the sun was low." A later riot, the battle of Rose Crescent, was described in the metre of Macaulay's "Horatius" in an early volume of *Punch*; and Dr. Teichman gives us Calverley's acrostic poem, beginning "On pinnacled St. Mary's lingers the setting sun." There are interesting little chapters on the boating man, who before 1825 was chiefly an undergraduate who went for picnics and water parties, and had altercations and more or less sanguinary encounters with bargees; on the reading man, for whom the writers of these skits and squibs have, naturally, small respect; on the sporting man, then known as the varmint man, who, after drinking much wine and indulging in Cyprian adventures—in Barnwell of all places—finds himself compelled to send for a surgeon, and is obliged to get an aegrotat. Dr. Teichman concludes his book with a useful index of colloquial or cant terms, and another of college nicknames. From this it appears that Hall was the gay college—the most lawless of all; Cats men were doves; men of Sydney owls; while for some unaccountable reason Johnians were always called Johnian hogs. There are illustrations in the book showing the academic costumes of Masters of Arts, Proctors, Fellow Commoners, and various other members of the University. The two distinguished classes of persons who wear top-hats with their gowns are noblemen and M.D.'s!

Otologists will be pleased to learn that Mr. Richard Lake, though seldom seen amongst them now, still retains an active interest in aural surgery, and has exercised it by publishing in a book about fifty of his lectures and papers.[9] They range over the whole subject of otology, but they serve to recall in particular his pioneer work in the surgery of the labyrinth, work for which, although by no means unknown, he has scarcely received full credit. There is one feature in common to all which can scarcely escape notice, and that is his commendable brevity, for the whole book only contains 255 pages, and includes a number of illustrations. The precision with which the essential points in each article are packed into a few pages recalls vividly Mr. Lake's own forcible and vigorous personality. The book is disfigured by an excessive number of misprints; there is far more than a reasonable allowance, especially in the portions in French. In other respects it is presented in a very convenient form, and the younger generation would do well to read it carefully, remembering that it is natural there should have been some changes and advances since the dates of the earlier papers. Any otologist who takes a serious interest in the literature of the subject should show his gratitude to Mr. Lake for rendering his work accessible by keeping a copy in the study for reference.

In his monograph on the treatment of bronchial asthma by intravenous injections of peptone[10] Dr. P. Boot reviews the articles published in this Journal in 1917, 1918, 1920, and 1921 by Dr. A. G. Auld, and records his own observations on twenty patients treated by this method. Of the eighteen patients in this series suffering from asthma eleven were more or less improved and seven derived no benefit from it. While admitting that twenty cases are not sufficient to estimate the value of Auld's method, the author maintains that peptone has the power to suppress an attack of asthma, though not always to the extent desired, and therefore cannot be regarded as a sovereign remedy. The treatment has no effect on the blood picture. Dr. Boot attributes the success of peptone treatment to the more or less complete destruction in the blood of a substance which, according to Sturm van Leeuwen, produces contraction of the smooth muscle fibres, and so gives rise to an attack of asthma.

The third edition of Professor R. H. Dennett's *Simplified Infant Feeding*[11] has been brought up to date, particularly with regard to the use of dried milk, the occurrence of acidosis, and the care of the hypertonic infant. The chapters on diarrhoea have been revised. As we mentioned when we reviewed the second edition on February 18th, 1922 (p. 274), the book is full of practical directions; it remains a valuable handbook of infant feeding.

[9] *Contributions to the Art and Science of Otology.* Lectures and Papers by Richard Lake, F.R.C.S., 1892-1925. London: Macmillan and Co., Ltd. 1926. (Demy 8vo, pp. 255; illustrated. 15s. net.)

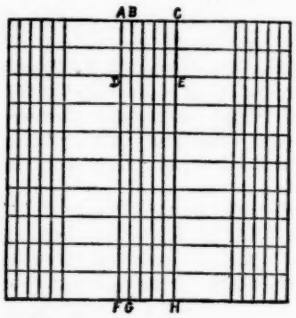
[10] *Die Behandeling van Asthma Bronchiale met Intrarenerze Pepton Inspuitingen.* By Dr. P. Boot. Amsterdam: H. J. Paris. 1925. (Roy. 8vo, pp. 135; 3.25 florins.)

[11] *Simplified Infant Feeding.* By Roger H. Dennett, B.S., M.D. Third edition, revised and enlarged. London: J. B. Lippincott Co. 1926. (Med. 8vo, pp. xi + 415; 14 figures. 21s. net.)

PREPARATIONS AND APPLIANCES.

Decimal Ratios in Haemocytometer Rulings.

The accompanying figure represents the central square of the ruling of a modified haemocytometer which in general construction is on the model of that of Thoma. It is designed to eliminate the necessity of calculation involved in the use of the latter instrument. For the enumeration of red cells a dilution of 1 in 200 is used, and an area of 1/5 sq. mm. (ACFH) is counted. To the number thus found it is necessary only to add four cyphers to obtain the content of 1 c.mm. of the original specimen. The percentage in relation to the normal—assuming this to be 5,000,000—is equal to the number of cells in 1/25 sq. mm. (ABFG or ACDE), for this area will contain exactly 100 in the case of a normal specimen. For the enumeration of leucocytes a dilution of 1 in 10 is employed, and 1 sq. mm. is counted. To the number found two cyphers are added to give the total per cubic millimetre of undiluted blood.



Dimensions: 1 mm. × ⅕ mm., divided vertically into fifths and twenty-fifths, and horizontally into tenths.

The most rapid work can be done by using a 2/3 in. objective and a ×10 or ×12 eyepiece, as with this the areas can be counted comfortably in vertical columns (ABFG) without moving the slide. This arrangement, probably on account of its similarity to the accustomed order in the tabulation of figures, gives considerably increased facility. With the 1/6 in. objective, however, it is more convenient to count in squares of the size of ACDE, which are equal in area to the narrow columns (ABFG). An eyepiece ruling, similar in design but on a larger scale, is available. It is less tiring to use than stage ruling, as the marking is more pronounced; but it is necessary to employ an appropriate microscope combination and tube-length, in order to secure exactly equivalent values. The scale used is 7 to 1, which is intended for use with a 2/3 in. objective. For differential counting of cells or bacteria on a plane slide the eyepiece ruling, which is carried on a simple glass disc, may be used with any power of objective.

The instrument is obtainable from Messrs. Allen and Hanburys, Ltd. The eyepiece fitting is not supplied as standard, but may be had separately.

A Desk for the General and Panel Practitioner.

Dr. E. W. Sharp (Bradford) has designed a desk to simplify the work of keeping medical record cards, and the book-keeping necessary for private patients. Eight drawers are provided, each of which will hold approximately 500 medical record cards, or 1,000 ordinary cards for private patients, together with index cards. The cards for private patients are arranged in three sections according as the accounts have to be posted, collected, or have been paid and no attendance is now being rendered. On the open part of the desk there is ample space for writing, and pigeon holes can be constructed at the back for storing certificate books. Part of the desk is closed and in it is a well containing a removable box, divided into four sections, the two front ones containing all the cards of patients, both private and panel, who are receiving attention, while those at the rear are used for storage. One side is devoted to patients who are being visited, on the other are kept the cards of patients who are attending the surgery for consultation. The cards of the patients who are being visited are divided by index cards showing the numbers 1 to 31 and the days of the week. By using two sets of these the cards can be changed from one week or from one month to another. The daily visiting list is made up from the cards which are behind the index card of the particular day. At the end of the day the visits are entered up and the cards transferred to the next dates on which visits are due. Dr. Sharp adds that all the information is readily available while sitting in the desk chair, and the work of book-keeping is reduced to a minimum. The necessary index cards are made by Messrs. Reynolds and Branson of Leeds, and have the advantage of combining the day book and ledger. Prescriptions and treatment can be recorded on them and they are of the same size as the record envelope issued by the Ministry of Health. A complete year's accounts can be kept on each card.

A Portable Mercury Sphygmomanometer.

The Baumanometer is a simple form of mercury sphygmomanometer with an ingenious arrangement to prevent spilling of the mercury during carriage. The makers claim that it is safe, portable, and efficient, and that the mercury does not oscillate at either systolic or diastolic pressures, so that it is well adapted to the auscultatory method of reading blood pressures.

Of the two types of sphygmomanometer—namely, the mercury and the aneroid—the latter is very widely preferred owing to its greater portability. The mercury manometer is, however, not only simpler but more accurate, inasmuch as it is not subject to errors due to changes in elasticity, etc. The makers of the Baumanometer (Messrs. Hawksley and Sons, Ltd., 83, Wigmore Street, W.1) claim that in their instrument there is no risk of loss of mercury during transportation, and that it is as convenient for use as the aneroid type.

Paton and Findlay to the effect that perhaps small people are more appropriate for modern industry? Agriculture in this country is not sufficiently remunerative to absorb a large number of extra workers; and notwithstanding the healthiness of the families of rural coal-miners, an influx of recruits in the depressed condition of coal-mining can hardly be contemplated. Perhaps at the present moment the best attitude of mind to Dr. Corry Mann's researches is that the questions he raises are not yet ripe for dogmatic statement, and that action should be withheld pending the result of further observations and experiments. This need not alter the view that milk is an excellent food for those who like it.

THE BRITISH ASSOCIATION.

SINCE the Prince of Wales, on the evening of August 4th, delivered his presidential address, of which we gave some account last week, the sections of the British Association have met on four days, according to plan, and the members have found recreation in garden parties, evening entertainments, and excursions, and on Sunday they listened to a number of sermons, including one by Sir Oliver Lodge and another by Dean Inge. On Monday afternoon the University conferred the honorary degree of D.Sc. upon eleven distinguished men of science attending the meeting; among them were Dr. Bohr, professor of physics in the University of Copenhagen, the Abbé Breuil, palaeontologist, the Astronomer Royal, Professor H. F. Osborn of Columbia University, New York, and Sir Edward Sharpey-Schafer, professor of physiology in the University of Edinburgh. On the evening of the same day a general meeting, very largely attended, was held to hear Professor Osborn's discourse on discoveries in the Gobi Desert by the American museum expeditions; it was illustrated by lantern slides and cinema films. In a lecture to the Section of Zoology Dr. G. D. Hale Carpenter raised some debatable points as to sleeping sickness. One was whether *T. brucei* of nagana was essentially the same as, and could become, *T. gambiense* of sleeping sickness, and whether *T. rhodesiense*, which caused the more acute disease in man, was derivable from *brucei* or *gambiense* or from both. He thought it possible that the nature of these trypanosomes might depend largely upon the mammalian host rather than upon the species of *Glossina* transmitting them, but that the method of transmission might have much to do with the degree of virulence. Another question was whether insects other than *Glossina* transmit sleeping sickness. Still another was whether big game was a danger; this problem could be solved only by experiment on a volunteer, but there was evidence that prolonged sojourn in an antelope rendered the trypanosome less able to live in man, so that big game might be beneficial rather than harmful. The Section of Physiology suffered somewhat from the fact that the International Physiological Congress was meeting simultaneously in Stockholm, as reported elsewhere. The president of the section, Professor J. B. Leathes, in his address on function and design, sought a definition of life. It was, he said, exhibited only in aqueous systems, containing unstable, perishable combinations of carbon with hydrogen, nitrogen, sulphur, phosphorus, and oxygen, in the presence of certain inorganic ions. The inalienable property such matter exhibited was that these unstable organic combinations were for ever re-forming themselves out of simpler combinations which did not exhibit this property; living material constituted so as to behave in this way appeared to be largely, if not entirely, of a protein nature; this power of self-reformation, spontaneous regeneration, operated not only when living organisms, cells, or communities of cells were growing, or reproducing their kind, but also during their maintenance. Properties and behaviour of cells resulted from those of the material composing them. When a muscle cell contracted there was a reversible rearrangement of its parts, but in other cells, such as connective tissue cells, certain reactions were irreversible. Such cells discharged into their vicinity some material, the chemical constitution of which was usually collagen, in which they became embedded, to form aponeuroses, tendons, and ligaments. After referring to the production of cartilage and bone, he said that the way in which the vertebrate connective tissues took their shape transferred a large share of the developing of the bodily form back into the nervous system, in which was stored machinery that directed and determined the habitual movements and postures. The work of Pavlov had made it clear that by a physiological reaction in the nervous system machinery might come into existence which did not exist before. It was probable, if not proved, that this new machinery was situated in what might be called the growing point of the central nervous system, the cortex of the cerebral hemispheres, the part where all is not cut and dry, where cells retain more of the properties of the developing neuroblast. In the formation of a conditioned reflex two events were made to occur in the cerebral cortex at times uniformly related to one another; one of these events necessarily, from the constitution of the nervous system, resulted in a certain activity of some muscle or gland. After many repetitions of the association of these events it was found that one which previously had never resulted in a particular activity came to have this result as certainly as the other. On Friday the section held a joint session with the Section of Zoology for a discussion on tissue culture; it was opened by Dr. H. M. Carleton, and in the course of it Miss H. B. Fell, Ph.D., said that the method of tissue culture *in vitro* was specially valuable as a means for investigating the capacity of isolated embryonic organs and fragments of organs for self-differentiation. Other discussions in this section were on the relation of vitamin B to "bios"; on the meaning of the symptoms of beri-beri, introduced by Dr. J. C. Drummond; and on reflex posture, to which Dr. F. M. R. Walshe, Sir Charles Sherrington, Mr. D. Denny-Brown, and Professor J. A. Gunn contributed. On August 10th Dr. J. S. Haldane, F.R.S., gave his promised lecture to the section on acclimatization to high altitudes; in the course of it he dealt with the physiological facts elicited by the Mount Everest expeditions, which, he said, were of a striking character. It had been shown that acclimatization sufficient to prevent any symptoms of mountain sickness could be obtained at a height of even 27,000 feet, and probably higher. He proceeded to discuss this observation, which might seem to be in conflict with laboratory experiments. To account for the acclimatization on Mount Everest without the assumption of active secretion of oxygen inwards by the lungs appeared to him to be a hopeless task.

MR. CHAMBERLAIN ON THE VOLUNTARY SYSTEM.

AFTER opening a new Ear, Nose, and Throat Hospital in Glasgow last week the Minister of Health made an interesting statement of his views as to the future of the voluntary hospital system. Mr. Chamberlain said that not very long ago those who were interested in voluntary hospitals felt serious anxiety as to their future, and had wondered whether it would be possible for the voluntary system to survive the after-effects of the war. This fear had been due largely to the enormous increase in the maintenance costs following the war, and in particular to the improvement of the conditions under which nurses worked, a reform which had been long overdue. Disaster

its subject and shows an appreciation of the circumstances which is quite surprising.

"Thus Harvey sought for truth in Truth's own book
—Creation—which by God himself was writ;
And wisely thought 'twas fit
Not to read comments only upon it,
But on th' original itself to look.
Methinks in Art's great circle others stand
Lock'd up together hand in hand:
Everyone leads as he is led,
The same bare path they tread,
A dance like that of Fairies, a fantastic sound,
With neither change of motion nor of ground.
Had Harvey to this road confined his wit,
His noble circle of the blood had been untrodden yet."

The little dark-complexioned physician was truly magnanimous. He wrote: "I would not charge with wilful falsehood any one who was sincerely anxious for truth, nor lay it to any one's door as a crime that he had fallen into error. I avow myself the partisan of truth alone." In him was reincarnated the spirit which animated Aristotle, and which had long been dormant. He was a high priest of the God-of-things-as-they are, and a forerunner of Hunter and Pasteur and Lister. As Professor Stirling has well said: "For all time he set the method, viz., that of experiment and induction, which has led to all modern progress in physiology." Well may the College which he loved celebrate this tercentenary.

MILK AS A GROWTH STIMULANT.

A SUMMARY of a report of an investigation on diets for boys during the school age, carried out by Dr. Corry Mann for the Medical Research Council, will be found at page 318. This report may, perhaps, be usefully set beside the results of the investigations on child life in Scotland undertaken by Professors Noël Paton and Leonard Findlay for the Medical Research Council, of which we gave an account a fortnight ago (July 31st, p. 214). Dr. Corry Mann's report has furnished the popular press with a headline because he discovered, among the advantages of adding a pint of milk to a boy's daily diet, that the boy developed more "spirit," and consequently was more often in trouble. The report from Scotland, which finds that maternal efficiency is the only factor manifestly correlated with nutrition in the young child, has not had the same journalistic attraction, but is of not less practical importance. The two reports, however, are not directly comparable, for the Scottish report dealt with children of pre-school years, whereas Dr. Corry Mann's dealt with boys in a boarding-school. Professors Paton and Findlay were concerned mainly with the influence of slum life on the growth and nutrition of children; Dr. Mann with the results of different diets on one class of boy living under well defined conditions. The Scottish investigators concluded that diet is not the main factor in determining the smaller size of the slum child as compared with the rural labourer's child; and they are of opinion that no statistical method can answer the question whether the weight of the child depends upon the diet or whether the diet is determined by the size and habits of the child. They think the suggestion that the consumption of fresh milk is the factor determining the difference in weight between town- and country-bred children is negatived by the fact that in rural miners' families with heavier and larger children even less milk is consumed than in slum families. In fact, Professors Paton and Findlay are led to the conclusion that income, condition of the home, diet, and maternal occupation and health have little to do with the small size of the slum child. Rather are they of opinion that urban populations differ racially from rural; that smallness is to some extent hereditary; that the smaller town dweller begets smaller children than the larger country dweller; that the difference is becoming accentuated by the decrease of emigration from country to town; and that the question may be asked whether the smaller town race is not really an adaptation to environment. The small machine-tending male, and the small, not too prolific female, requiring little food and little exercise, are better suited to urban surroundings than the big brawny man and the large prolific woman, whose energies are more appropriate for rural surroundings. Professors Paton and Findlay find, in fact, that in the slum child after 18 months of age the inherited growth impulse is sufficiently potent to carry it on to the average size of its parents, and that the average diet of the population must be at least sufficient to supply the material and energy required for growth.

Of Dr. Corry Mann's investigation the Medical Research Council, in its preface, says that its chief value may prove to be that it raises many more questions than those to which it gives a definite answer. At all events, there have been no recorded observations comparable in scope and in experimental validity. The startling results due to the addition of a pint of milk a day to a basic diet which already satisfied the appetite of growing boys, were proved to be due, not to the small increase in the fuel value of the diet, nor to the extra protein in the milk, but to more specific, but unexplained, qualities of milk as a food. The addition of this pint of milk converted an average annual gain of weight of 3.85 lb. into one of 6.98 lb., and an annual average increase of height from 1.84 to 2.63 inches. Were these increases due to vitamins or to some other factors? The results were checked by a comparison of the effects produced by replacing the milk with other substances giving a similar number of calories. Thus a measured quantity of sugar was given, with very poor results, showing that the improvement in the physical condition was not due merely to the addition of calories. With a diet containing more vitamin A provided by watercress there was a definite improvement in weight increment, but not in height, and there was some improvement in the skin (chilblains and roughness) and in the general physical condition, although the increase in the calorie value of the diet was negligible. The addition of casein, which altered considerably the protein quality in the basic diet, produced singularly little effect on nutrition. The only approach to the effects of adding milk to the basic diet occurred when butter was substituted for the milk. The average annual gain in weight was then 6.30 lb., and the average increase in height 2.22 inches. Vegetable margarine, which was deficient in vitamin A, showed an increase in average annual weight increment to 5.21 lb., but the average growth rate remained the same as with the basic diet, 1.84 inches.

Whether these results should add new weight to the "Drink more milk" slogan, or whether it would be well to await the result of further observations, it is not easy to say. It would be interesting to know, for example, whether the boys continue to lengthen and expand at the same rate—all the boys examined were between the ages of 7 and 11—and whether increase of "spirit" continues *pari passu*. And if a race of giants is gradually established, what is to be done with them in view of the hint of Professors

A CODE OF MANNERS FOR MOTOR DRIVING.

LORD MONTAGU OF BEAULIEU, who before now has told motor drivers some plain truths, published recently an article in the *Times* on road manners, and a few days afterwards our contemporary published a leading article which began by saying that road manners might be not only bad, but wicked, and even in their milder manifestations bad road manners were inconvenient and a nuisance. As a remedy for dangers as they exist the *Times* wants a slogan so direct and simple that "the wayfaring men [and women], though fools, shall not err therein." We commend to the notice of the *Times* the "offside rule" for the motor driver; it has been adopted by the Automobile Association, and provides a slogan than which nothing can be more direct and simple: "Watch for traffic—horse, motor, or pedestrian—on your right hand." Incidentally a study of this rule will reveal that without some such rule police and magistrates are not in a position to distinguish amid the chaos of conflicting evidence, and so fix the responsibility for accidents with some measure of justice. It is just this fixing of responsibility which will reduce the toll of accidents to those which are really unavoidable. The article by Lord Montagu of Beaulieu raises yet another problem, though the adoption of a code of manners such as he suggests would undoubtedly contribute to solving it. It is well that he notes the uncertainty about the convention of hand signals, for the fewer the signals the better; and that he also calls attention to the bad manners of neglecting to keep to the near side of the road, of blocking the road with stationary cars, of leaving a car directly opposite an entrance, of smoky exhausts, and of glaring headlights in towns where only side-lights are necessary. Of the complaints to which he gives utterance that which perhaps has most medical interest is about the making of unnecessary noise by too frequent sounding of the horn, or by using open exhausts or inefficient silencers. These noises are a growing nuisance, especially at night, and, as Lord Montagu points out, cause suffering not only to the sick, but to all classes of the population who desire to sleep. The use of the horn is a difficult problem for the motorist. The experienced motorist can drive perfectly safely with hardly any sounding of the horn, and at night in the country the use of headlights renders its use almost completely unnecessary. On the other hand, the first cry of every pedestrian who thinks he has missed being run over is usually, "Why didn't you hoot?" For the "cut-out" and the inefficient silencer there is now no excuse whatever. The motor cyclist is the worst offender in this way, and he becomes a danger on the road because the noise of his open exhaust prevents him from hearing the warnings of overtaking vehicles. As magistrates are empowered to impose fines on the owners of vehicles not properly silenced, there should be no difficulty in dealing with this nuisance. At present it continues apparently unchecked, so that the Home Secretary has been impelled to issue a warning to all users of motor cars, and particularly motor cyclists, that he has instructed the police to take active steps to enforce the law relating to the use of silencers. The law is twelve years old, and was last amended four years ago; the Home Secretary described the nuisance as intolerable. The prefect of police in Paris speaks of the intolerable noise made by cars not fitted with silencers, and has called a special meeting of the permanent traffic committee to consider rules he proposes to make. Lord Montagu says that "the motoring organizations are trying all the time to inculcate good manners and due consideration for others by publishing rules to be observed." One of the questions raised by his article seems to be whether the time has not arrived for these organizations to meet together and discuss the whole subject of the courtesies of the road. It is by no means certain that the various bodies are at present so fully agreed on these courtesies that they could be embodied in a code sufficiently simple and not too lengthy. But without such a code driving is bound to be unnecessarily dangerous to drivers and pedestrians, more and more unpleasant, at least to residents along arterial roads, and increasingly chaotic.

THE SCIENCE OF GENETICS.

SOME months ago the members of the Dundee Branch succeeded in persuading Dr. F. A. E. Crew, director of the Animal Breeding Research Department at Edinburgh, to give them a British Medical Association Lecture on the mechanism of inheritance, and we are now able to present it to a larger audience, some of whom may find it stimulating holiday reading. A new department of biological science, with its own body of observations and theories and a special terminology, has sprung up since the majority of those now in practice left the schools, and those engaged in its prosecution believe, with Dr. Crew, that the medical man will do well to make himself acquainted with its principles, since they will help him to a better understanding of some of his many and varied problems. The rapid advance of genetics may be dated from the early years of this century, when, as Professor J. B. Leathes said in concluding his address at Oxford, the forgotten experiments of Mendel came to the surface again, and found corroboration in the cytological studies that from about the same time had pursued their slow obstructed way in the attempt to elucidate the changes in the nucleus of maturing germ cells. He went on to express the view that to-day the study of genetics and of the topographical anatomy of the chromosomes, with its groupings and crossings-over, seems to call out for chemical assistance. Those who wish to pursue one aspect of the matter further may consult the small volume *An Introduction to Experimental Embryology*,[1] by Mr. G. R. de Beer, Jenkinson Memorial lecturer in comparative and experimental embryology at Oxford. Perhaps because the units with which they deal are beyond the powers of the microscope, exponents of the new science, like Dr. Crew, consider it necessary to be extremely precise and logical in their expositions; and though Mr. de Beer does not suffer to so large an extent from this disadvantage he also is severely logical in his explanations, so much so that the book is by no means easy reading. It is full of facts as well as theories, and neither by his manner of using the new terms nor by his literary style does Mr. de Beer do much to conciliate his readers. Nevertheless the book is well constructed and extremely informing.

AN ESSAY ON THE UNKNOWABLE.

THE Dean of St. Paul's, invited to deliver the Fison Memorial Lecture for 1926 at Guy's Hospital Medical School, bravely set forth to explain his views on *Science and Ultimate Truth*, and the lecture has been published in pamphlet form.[2] It is extremely interesting, even if at times the ideas and the language which clothes them are not too easy to understand. The Dean, like every human being who takes the trouble to think, has a philosophy of his own; and in his lecture he strives to explain how his philosophy differs from that of Hume, Kant, and Hegel, no less than from materialism, epiphenomenalism, positivism, agnosticism, and pluralism. It would appear that he accepts the existence of a Supreme Being, independent of the universe in the sense that

[1] *An Introduction to Experimental Embryology.* By G. R. de Beer, M.A., B.Sc., F.L.S. Oxford: The Clarendon Press. 1926. (Crown 8vo, pp. 148. 7s. 6d. net.)

[2] *Science and Ultimate Truth.* London and New York: Longmans, Green and Co. 1926. (5½ × 8, pp. 32. Paper cover, 1s. net; cloth, 2s. net.)

had been averted by a grant of about half a million pounds by the Government of the day some five years ago. To-day the position was very considerably improved, although it could not yet be described as entirely satisfactory. Population was still increasing, and during the war it had not been possible to make those extensions of voluntary hospitals which were from time to time necessary. The result was that to-day the needs of the public were far from being adequately met, and further beds were urgently required. The Hospitals Committee had recommended 13,000 extra beds, but if they were got anxieties would be increased, because every new bed meant an increase in the heavy annual cost of maintenance. In an ideal state of society institutional treatment would be available for everyone who needed it. He hoped to advance the solution of the problem by the proposals he had recently made with regard to the reform of the Poor Law. Under them boards of guardians in England and Wales would cease to exist, and their functions would be taken over by local authorities. In England something like 30,000 beds were under the control of boards of guardians, in many cases almost exactly of the same character as those in voluntary hospitals. These beds would come under the control and supervision of the local authorities. The question would arise whether it would be possible to devise a scheme under which municipal and voluntary hospitals could work together in close co-operation. He had not in contemplation, at any rate at the present time, any legislation which would interfere with the working of the voluntary hospital system. One aim should be to establish some central health authority in every district. The area of such a district might well be the local government area or the area of the county council. Such a body as he proposed would have to survey what hospital accommodation was necessary, and to consider the question of duplication, which was a waste of money and effort; it should therefore have the power of veto over extensions of individual institutions. On the other hand, it would naturally be called upon to give assistance to individual institutions, provided they conformed to generally approved lines of policy. To preserve the best features of the voluntary system it would not do to work too much in watertight compartments. A greater amount of co-operation seemed to be the ultimate goal. He believed that any system under which people looked all the time to the State to help them would be disastrous. He believed in self-help, in initiative, and in independence, but, at the same time, he thought that if the country was to get the best out of its resources there must always be someone to see that there was co-ordination.

MINER'S PHTHISIS IN SOUTH AFRICA.

DR. W. WATKINS-PITCHFORD is leaving South Africa after some thirty years spent there in pathological, bacteriological, and public health work. After holding several appointments in Natal and the Transvaal, Dr. Watkins-Pitchford became the first director of the South African Institute for Medical Research, Johannesburg. In 1916 the Legislature of the Union established a Miner's Phthisis Medical Bureau to administer the medical sections of the Miner's Phthisis Act, and Dr. Watkins-Pitchford was appointed chairman. We have received a copy of Dr. Watkins-Pitchford's swan-song in the shape of the report of the bureau for the year ending July 31st, 1924. The report is a sufficiently voluminous proof of the energy and activity he has displayed. The bureau consists of whole-time officers responsible directly to the Government. Their work is of great pecuniary importance to the gold-mining industry of the Transvaal, which has to pay compensation to mine workers and their dependants in cases of miner's phthisis; the expenditure involved is about £800,000 a year. The medical officers undertake an "initial" examination for fitness of all those who wish to work in the mines, and a "periodical" examination of all who are exposed to quartz dust in the mines, every six months of Europeans and every three months of natives; a "benefits" examination of any worker who believes he has contracted miner's phthisis; and *post-mortem* examination, in the interests of the dependants, of all deceased mine workers. The disease, whether it is complicated by tuberculosis or not, is always referred to by the officers of the bureau as "silicosis." It appears that at the initial examination from 42 to 73 per cent. of the candidates for mine work have been rejected in various years, almost entirely for pulmonary defect. As a result of this stringent test, amongst 6,000 Europeans passed since 1916 only seven cases of silicosis have occurred, and only twelve cases of simple tuberculosis. Periodical examinations of 12,000 European working miners showed an incidence of simple tuberculosis of 90 per 100,000, as compared with 321 per 100,000 in 1920. The rate of incidence of simple silicosis, however, has risen from 1,756 to 2,652 per 100,000; 319 fresh cases have occurred in the 12,000 workers during the year under review. But practically all these new cases were amongst men who were working before 1916. The mean duration of employment in the mines before the appearance of signs of the disease—the "average effective period"—has risen from 113 months to 125. It has been found that early retirement from the work does not affect the prognosis of silicosis. Retirement is compulsory for simple tuberculosis and for tuberculosis with silicosis; the rate of incidence for the last mentioned condition has fallen from 800 to 164 per 100,000. The diagnosis of silicosis has been greatly helped by radiography. In 225 out of 541 ex-miners who had been compensated for silicosis before the bureau was formed, no evidence of either silicosis or tuberculosis could be found on examination for a further compensation claim. *Post-mortem* examination of 122 miners showed that silicosis was responsible for death, or contributory to it, in 41 per cent. of the cases. The 178,000 native labourers are not all submitted to examination, but only those who are sent by the mine medical officer as suspected cases of tuberculosis or silicosis. Consequently the rates of incidence of the diseases are not strictly comparable with those amongst Europeans. But there is no doubt that silicosis is comparatively infrequent amongst natives. This is accounted for by the fact that few natives work more than six or nine months at a time, and then have long holidays at their kraals. Dr. Watkins-Pitchford has come to the conclusion, as the result of a special investigation of natives who had worked continuously for longer than five years, that the native is neither less nor more susceptible to silicosis than the European. During this special investigation several cases of simple tuberculosis and tuberculosis-with-silicosis were discovered which had not been suspected. Dr. Watkins-Pitchford attaches great importance to "this unsuspected reservoir of infection" from carriers, and thinks that they may reasonably be credited with having originated many of the 878 other cases of tuberculosis and of the 438 fresh cases of silicosis which occurred during the year. He advocates the creation of a small but energetic organization for the detection of tuberculosis amongst native recruits and employed labourers. The report contains notes upon cancer of the lung, upon the pathological changes in the lungs which are specific to silicosis, and upon the non-prevalence of syphilis, Bright's disease, and miner's nystagmus. This report of the Miner's Phthisis Medical Bureau shows that Dr. Watkins-Pitchford has indeed deserved well of the country of his adoption.

THE INTERNATIONAL PHYSIOLOGICAL CONGRESS AT STOCKHOLM.

(From L. E. BAYLISS, a Member of the British Physiological Society.)

THE twelfth International Physiological Congress, which began on Tuesday, August 3rd, at Stockholm, is undoubtedly one of the largest and most truly international that has ever been held, since there are 600 members, from absolutely every country in Europe, from China and Japan, and from the United States and Canada. We are having presented to us 272 communications and 40 demonstrations, with the result that it is quite impossible to hear more than a very small fraction of them, although it is possible to get some idea of a certain number more with the help of the summaries printed in the *Skandinavisches Archiv für Physiologie*.

Address of Welcome.

The congress opened with an address of welcome on behalf of the Swedish universities by the Archbishop of Sweden, who made an appeal, in excellent English, for the purity of science and the necessity for the pursuit of knowledge as an end in itself, without thoughts of practical utility. The Governor of the City of Stockholm then welcomed (in French) the congress to the city and placed its resources at our disposal, and the principal of the Caroline Institute expressed (in German) the delight with which his institute received us in Stockholm.

The Mechanisms of Biological Oxidation.

After a short address by the president, Professor J. E. Johansson, in which he deplored the deaths of so many famous physiologists in the last three years, Professor Sir F. Gowland Hopkins gave a lecture on the mechanisms of biological oxidation. Opening with a defence of the modern tendency of biochemical laboratories to separate themselves from the physiological, and though emphasizing the necessity for close co-operation, he advocated the development of institutes of general biochemistry, which would not be tied down to the study of animal problems, but would deal also with those of plants and micro-organisms. These introductory remarks were well justified by the subsequent more technical statement, in which much of the experimental evidence that has led to the modern conception of biological oxidations has been obtained in the lecturer's own laboratory at Cambridge.

In order to account for the fact that in living tissues substances are oxidized quite readily, which can only be dealt with *in vitro* by means of powerful chemical reagents, Warburg has supposed that the molecules of oxygen are activated probably by traces of iron. Wieland, on the other hand, regards the activation of the substance to be oxidized as more important, or, more exactly, the activation of a constituent hydrogen atom, so that it can combine readily with a "hydrogen acceptor"; this may, of course, be molecular oxygen, or in its absence some easily reducible organic compound.

After presenting the evidence in favour of these two views in a beautifully critical manner, the lecturer went on to the most recent developments of the subject, which take into consideration the possible effects of the electrical fields at charged surfaces, which may be quite large, the conceptions of oxidation and reduction as essentially a transfer of electrons from the substance oxidized to the substance reduced, and described the two forms of "hydrogen transporter," whose function it is to act as intermediaries in the transport of the activated hydrogen to the final hydrogen acceptor, which in the case of normal living cells is oxygen. In plants the chief hydrogen transporters are polyphenols, and in animals the organic sulphides, notably a dipeptide of glutamic acid and cystein —"glutathione."

Finally, Professor Hopkins reached the conclusion that, of the two views, Wieland's was the more important, although it would be absurd to suppose that activation of oxygen never occurred in the living cell—there is too much evidence in favour of it—but the subject is complicated by the fact that not only does iron activate molecular oxygen, but it can also catalyse the transport of activated hydrogen by glutathione.

The Sections.

The sessions of the congress began in the afternoon, taking place in four sections simultaneously, each devoted, more or less, to one branch of physiology; they are to continue every morning and afternoon till Friday, August 6th. So far the work which has been reported here that will probably have the most interest to those engaged in medicine have been the experiments of Magnus and his fellow workers in Utrecht on the function of the cerebellum in the balancing reflexes; the measurement of the heat produced by a nerve on stimulation, by A. V. Hill and R. W. Gerard of London; and the recording of the electrical response of a nerve stimulated through its own end-organ —for example, touch and pain—by Adrian of Cambridge. Kato, from Tokio, has brought forward his theory of the decrementless conduction in narcotized nerve, and Girard and Peyré of Paris have defended their theory that by injecting caesium eosinate into an animal it is protected from subsequent injections of substances which would normally produce shock. The modern conception of the spleen as a reservoir of blood corpuscles, to be discharged into the blood as soon as there is any tendency towards asphyxia in the tissues, has been demonstrated by Barcroft of Cambridge on a dog brought over specially; this conception has been confirmed by Scheunert and Krzywanek of Leipzig. Recent observations on the heart occupied the whole of one section on Tuesday afternoon (August 3rd), notably the work of Anrep and co-workers of London on the coronary circulation, and Loewi of Graz on the production of an inhibiting substance, believed to be a complicated ester, by stimulation of the vagus.

Distractions.

On Tuesday evening the whole congress made an excursion to Skansen, which is an open-air museum and zoological gardens on a rocky height overlooking Stockholm. Here are to be seen replicas of old Swedish houses and Lappland huts, and here were arranged folk-dancing and folk-singing. Refreshments were obtained in a restaurant built and decorated as an ancient Swedish house, and were served by attendants in old-fashioned costumes.

This evening (Wednesday) the city of Stockholm gives a banquet in the city hall, which, together with the concert hall, in which the opening meeting was held, is a very fine example of modern Swedish architecture, undoubtedly some of the finest in the world.

Stockholm, August 4th.

DIET FOR SCHOOLBOYS.

BETWEEN 1921 and 1925 Dr. H. C. Corry Mann conducted an investigation into diets for boys, and his report has been published by the Medical Research Council.[1]

Dr. Mann's observations were made at an institution near London, where some six hundred boys are housed under the "villa" system; there are thirty to thirty-five boys in each house, and the rate of sickness is low. During four years records were made by weighing sample rations daily for each of the three meals, thus obtaining minimum and maximum helpings for smaller and larger boys. This was called the basic diet; and it supplied from 1,679 to 2,154 calories daily—37.3 calories per lb. of body weight for a boy of 45 lb., and 35.9 calories per lb. of body weight for a boy of 60 lb. For the purposes of investigation boys of southern English stock were selected, excluding all trace of colour or of foreign, Latin, Scandinavian, or Hebrew type. Their ages varied from 7 to 11 years, their

[1] Medical Research Council, Special Report Series No. 105. *Diets for Boys during the School Age.* By H. C. Corry Mann, O.B.E., M.D. H.M. Stationery Office, London, Manchester, Cardiff, Edinburgh, Belfast; or through any bookseller. Price 2s. 6d. net.

Shakespeare was independent of his plays. But the plays are the necessary expression of the mind and character of Shakespeare. We gather that, similarly, he holds the universe to be the necessary expression of the mind and character of the Supreme Being, though we know nothing of the motives of creation. The world is a solid fact, says the Dean, which we have to accept, not to account for. Although the innermost nature of the Supreme Being is unknown to us, He has revealed Himself under the three attributes of goodness, truth, and beauty. These are eternal and ultimate values, and not inactive thoughts. The whole duty of man and the path by which he can claim his status in the eternal world is in the apprehension of these eternal values, and in earnestly striving to co-operate with the Divine will in actualizing them. The values are three paths up the hill of the Lord, which may be supposed to unite at the top. And three specialists, apparently, lead men up the paths—the saint, the poet, and the man of science. At present religion, science, and art are jealous of one another, because each claims, in a sense, to cover the whole field—that is, to interpret all experience from its own point of view. Philosophy tries to mediate between them, and the task has so far been beyond its powers. But the eternal values are not entirely separate from each other; they are, in Dean Inge's view, a triple star, the attributes under which the one Supreme Being has revealed to us His nature and His will. The Dean's most arresting statement is, perhaps, that "the world is a solid fact, which we have to accept, not to account for." The facts of the world, and some of the facts of the universe, can be dealt with by man's intelligence. The unfortunate thing about philosophy is that it is bound to lead to realms which are beyond man's comprehension. It may be that the only attitude of mind towards the nature of those realms that is consistent with man's shortcomings is recognition that the finite cannot comprehend the infinite. And perhaps the man of science, as he slowly plods his way to such knowledge as is within his powers, may sometimes ask himself, "What is truth?" Whether the saint and the poet should also ask themselves "What is goodness?" or "What is beauty?" is not for us to say.

RESEARCH DEFENCE SOCIETY.

THE *Journal of the Research Defence Society* for July, in addition to an obituary notice of its founder, Mr. Stephen Paget, illustrated by an excellent portrait, and a report of the annual general meeting, of which we gave an account on July 3rd (p. 27), contains an article by Mr. Leslie R. Aldous of the League of Nations Union, entitled "Fighting disease internationally." Mr. Aldous sketches the work already done by the Health Organization of the League of Nations. In the early days its energies were occupied by epidemics of typhus and typhoid in Eastern Europe; and a line of hospitals, and of disinfecting and quarantine stations, was established along the whole Polish frontier. Since this emergency action the Health Organization has been dealing with sleeping sickness, tuberculosis in South African mines, cancer researches, and malaria. Its Malaria Commission is concerned at the inadequate supply of quinine available, and is carrying out experiments with substitutes. The League of Nations has also supplied health advisers to certain countries, such as Albania and Persia. The president of the Research Defence Society is Lord Lamington, and its chairman is Lord Knutsford. Sir David Ferrier and Lady Horsley are the honorary treasurers of the society, Dr. G. P. Crowden is honorary secretary, and Dr. Alfred Salter, M.P., its parliamentary honorary secretary. The Research Defence Society's address is 11, Chandos Street, London, W.1.

THE PROFESSIONAL CLASSES AID COUNCIL.

THE Professional Classes Aid Council has now completed five years of work since it was reconstituted from the Professional Classes War Relief Council formed in October, 1914. The report of the council for 1925-26 shows that it does much useful work upon rather a slender income; and this year, for the first time since 1921, there is a slight excess of income over expenditure. The council wisely devotes much of its effort to assisting in the education of the children of applicants; but help is also given in illness, towards maintenance, and for bridging a period before the recipient is in a position to be independent of further help. The necessity for inquiry into the good faith of applicants seems to be fully recognized; and the council would appear to have established satisfactory relations with the numerous professional societies which are represented on it. Existing medical charities probably render it unnecessary for any large number of members of the medical profession to apply for relief. The British Medical Association is represented on the council by Mr. Bishop Harman.

THE HALF-YEARLY INDEXES.

THE usual half-yearly indexes to the JOURNAL and to the SUPPLEMENT and EPITOME have been printed; they will, however, not be issued with all copies of the JOURNAL, but only to those readers who ask for them. Any member or subscriber who desires to have one or all of the indexes can obtain what he wants, post free, by sending a postcard notifying his desire to the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1. Those wishing to receive the indexes regularly as published should intimate this desire.

AN Order of Council has been issued altering the composition of the Committee of Privy Council for Medical Research, the ministerial body under which the Medical Research Council conducts its work. The Committee originally consisted of the Lord President of the Council, the Minister of Health (England and Wales), the Secretary for Scotland, and the Chief Secretary for Ireland, but the last named office has become obsolete as a result of the changes in the government of Ireland. In view of this vacancy, and of the increasing relation of the Medical Research Council to research work in oversea parts of the empire and in industrial medicine, the Secretaries of State for Home Affairs, for Dominion Affairs, and for the Colonies have now been added to the Committee.

THE first number of the *Journal of Neurology and Psychopathology* to be issued by the British Medical Association (that for July) has been published. The *Journal* continues to be edited by Dr. Kinnier Wilson, with the assistance of an Editorial Committee of psychologists. It is published quarterly. The annual subscription, which should be sent to the Financial Secretary and Business Manager of the British Medical Association, Tavistock Square, London, W.C.1, is 30s. The price of single numbers is 8s. 6d. post free. The new number contains an analysis of the affective symptomatology of disseminated sclerosis founded on 100 cases, by Dr. S. S. Cottrell of Richmond, Virginia, and Dr. Kinnier Wilson; the first part of a lecture on the psychology of character, by Dr. William Brown; a report of a case of recovery from spontaneous subarachnoid haemorrhage, by Dr. Parkes Weber and Dr. Bode, from the German Hospital, London; an editorial article on perspective in psychiatry; and a set of abstracts.

appear in the following three tables, which are abbreviated from those in the report.

Table showing Fate of 357 Patients Operated on for Cancer of the Breast, at Three Years after Operation (1910–13 and 1919–21).

	Cl. I.	Cl. II.	Cl. III.	Unclassed.	Totals.
Cases	87	124	100	46	357
Alive at three years... ...	78	45	28	23	174
Died from other causes ...	4	6	10	5	25
Died within three years after operation	5	73	62	18	158

Percentage alive after deducting deaths from other causes: Class I, 94.0; Class II, 38.1; Class III, 31.1; unclassed, 56.1; all classes, 52.6.

Table showing Fate of 286 Patients Operated on for Cancer of the Breast at Five Years after Operation (1910–13 and 1919–20 inclusive).

	Cl. I.	Cl. II.	Cl. III.	Unclassed.	Totals.
Cases	74	97	74	41	286
Alive at five years	63	18	10	11	102
Died from other causes ...	5	7	8	5	25
Died within five years after operation	6	72	56	25	159

Percentage alive after deducting deaths from other causes: Class I, 91.3; Class II, 20.0; Class III, 15.1; unclassed, 33.6; all classes, 39.1.

Table showing Fate of 171 Patients Operated on for Cancer of the Breast, at Ten Years after Operation (1910–13).

	Cl. I.	Cl. II.	Cl. III.	Unclassed.	Totals.
Cases	49	58	40	24	171
Alive at ten years	35	3	2	4	44
Died from other causes ...	9	6	4	6	25
Died within ten years after operation	5	49	34	14	102

Percentage alive after deducting deaths from other causes: Class I, 87.5; Class II, 5.8; Class III, 5.5; unclassed, 22.2; all classes, 30.1.

A comparison of these three tables shows that the percentage of survivors in Class I (in which the disease had not extended beyond the mammary gland at the time of operation) is not only higher than in any other class, but that, if allowance is made for deaths from causes other than cancer, it remains almost constant up to the end of the ten-year period, the figures being 94 per cent., 91.3 per cent., and 87.5 per cent. The unabbreviated tables in Major Greenwood's report also show that a considerable percentage of the more advanced cases survive three years after operation, a smaller number survive five years, but only an occasional one survives up to ten years.

C. *Survivorship.*

The object here was to ascertain the number of survivors in the several categories, in successive years after the operation, and to compare this with the normal decrease in an equal number of healthy subjects. The chief interest centres round Class I. It is shown that the survivors of this class ten years after operation number only 14 per cent. below the normal average figure for healthy people. "It is," the report remarks, "impossible to regard this result without feelings of the greatest satisfaction."

THE NATURAL DURATION OF CANCER.

Dr. Major Greenwood's report (No. 33), on the natural duration of cancer, is partly theoretical in its aim. In discussing the relative advantages which different methods of operation confer on patients, it is obviously desirable that there should be a clear understanding as to the terms in which the "advantage" is to be expressed. Some mathematical formula which would serve as a standard of comparison is what seems to be required, and in Dr. Greenwood's opinion three conditions should be taken into account in the construction of such a formula—namely: (*a*) the average duration of the life of a healthy person of the same age as the patient; (*b*) the average duration of the life of a patient untreated; and (*c*) the average duration of the life of a patient operated upon. With these data given, the following procedure might be followed, taking a purely imaginary case for illustration: If the average duration of life in health (*a*) is eighteen years and that of the untreated patient (*b*) only three years, the disease reduces the expectation of life to three-eighteenths of the normal; if now we find the average duration of life in the operated patient (*c*) to be nine years, his expectation of life has evidently been increased six years by the operation—that is to say, the advantage gained is six-eighteenths of the average duration of life in the healthy. The advantage is expressed by the formula $A=\frac{c-b}{a}$. It has to be remarked, however, that since the normal expectation of life diminishes with age, the denominator in the above formula would be very small in an old patient and the calculated advantage would be correspondingly large, although, counted in years instead of ratios, the advantage would not in reality be greater than in a young patient. In short, the advantage would appear to increase with age, and Dr. Major Greenwood notes that this would need to be borne in mind. In order, further, that the formula should be consistent, it is necessary that the other two averages should not be materially affected by differences of age; according to the report they are not, there being no significant relation between age at onset and duration, if the data may be considered numerous enough to establish the point.

With regard to the three averages referred to above, the first (*a*) is known with considerable accuracy, the third (*c*) is known to a rough approximation in certain forms of cancer only; for the "natural" duration of life of untreated cancer patients (*b*) we have rather more information, and one object of the report was to collect it. The data analysed are from several hospitals, and include 4,238 cases relating to seven primary sites—namely, the tongue, breast, uterus, rectum, oesophagus, larynx, and stomach. The two longest series are those of Drs. Lazarus-Barlow and Leeming and of Dr. Wyard, and the conclusions reached confirm the conclusions of those authors in all important points. The average duration for all ages, of cancer of the above-named organs, when untreated, is exhibited in the following list; where more than one figure is given opposite the same organ the figures are from separate series of cases.

Breast	39.8; 39.57; 32.78; 36.54	months
Stomach	17.08	,,
Rectum (females)	27.14; 25.71	,,
,, (males and females)	28.65; 25.46	,,
,, (males)	21.42	,,
Cervix uteri	22.72; 18.76; 20.12; 15.35	,,
Uterus and cervix	18.22	,,
Tongue and mouth (males)	16.49; 15.25; 16.94	,,
Oesophagus (males and females)	11.35	,,
Larynx (males and females)	14.09	,,

THE MIDWIVES AND MATERNITY HOMES ACT.

THE Midwives and Maternity Homes Act (1926) received the Royal Assent on August 4th. Part I of the Act comes into force at once, and Part II, referring to the registration of maternity homes, on January 1st next.

Practice of Midwifery.

The Act prohibits the attendance by a male person or by a woman not certified under the Act upon a woman in childbirth unless under the direction and personal supervision of a duly qualified medical practitioner; but this provision is not to apply to a person who, while undergoing training with a view to becoming a duly qualified medical practitioner or a certified midwife, attends a woman in childbirth as part of a course of practical instruction in midwifery recognized by the General Medical Council or by the Central Midwives Board. The next clause provides that where a midwife has been suspended from practice in order to prevent the spread of infection she shall, if not herself in default, be entitled to compensation from the local supervising authority.

Subject to the sanction of the Minister of Health, local supervising authorities may make arrangements with pregnant women in their area for the payment by such women to the authority, by instalments or not, of sums to cover any liability which the authority may incur under Section 14 of the Midwives Act, 1918,

weights from 45 to 60 lb. Any disabilities observed in the boys were due to deficiency of weight and height for age, and not to infective disease. An equal number of the same age and rating was assigned to each of the houses in which the investigations were carried out. After a preliminary period of observation, the group of boys in House I, receiving only the basic diet, were kept under strict observation, and records made of their general health, gain in weight, and increase in height. In House II each boy received in addition to the basic diet one pint of fresh cow's milk daily. In House III a daily ration of 3 oz. of castor sugar was added to the basic diet; in House IV 1¾ oz. of butter; in Houses V and VI 1/2 to 3/4 oz. of watercress; in House VII 3/4 oz. of casein, and in House VIII the same amount of vegetable margarine. The object of these researches was to discover whether an increase of height and weight could be best obtained by giving the boys merely more calories by means of the sugar ration, by adding fat alone, by giving fat with vitamin, or by adding vitamin alone. The casein ration was chosen for the purpose of discovering whether improvement in the biological value of the protein might not be more necessary than any other change in the basic diet.

The basic diet in use at the institution contained only a relatively small amount of fat. In a diet of good average quality the fat accounts for 30 to 35 calories. In the basic diet it accounted for only 18. The protein was adequate for growth, although only 25 per cent. instead of the normal 35 to 45 per cent. was from animal sources. The carbohydrates, consequently, were in excess and accounted for 68 per cent. of the calories of the basic diet, as compared with 50 per cent. in a good average diet. The calorie value of the basic diet appeared adequate, though an improvement in nutrition would probably occur if the balance and quality were altered. Boys on the basic diet grew an average of 1.84 inches a year, and gained 3.85 lb., as compared with an average increment of 5.5 lb. observed in healthy school children of the industrial class. The boys who received in addition the cow's milk ration gained an average of 6.98 lb. and grew an average of 2.63 inches. With sugar the average gain was 4.93 lb. per boy and 1.94 inches; with butter 6.30 lb. and 2.22 inches; with margarine 5.21 lb. and 1.84 inches; with casein 4.01 lb. and 1.76 inches; with watercress 5.42 lb. and 1.70 inches. Incidentally it was found that on all diets there was invariably rather more growth during summer than during winter, and usually more gain in weight. A further point of interest is that the boys who got the extra ration of milk not only did best in weight and height but were "obviously more fit than those of the other groups." There was a general absence of illness. The boys lost the marked tendency to chilblains in the winter, and a roughness of the skin and tendency to pot-belly which were common among those eating only the basic diet. They became far more high-spirited and irrepressible, and for this reason were often in trouble, but there was no indication of greater proficiency at school.

The conclusion reached in the report is that in an institution where there was no deficiency of fresh air or sunshine an immediate improvement in physique followed an alteration in the quality of a diet which was adequate from a physiological standpoint. This improvement was most marked when fresh cow's milk, recently pasteurized, formed the additional item of food; and the improvement, both in weight and height increments, was not temporary but was maintained over a period of one, two, or three years. In an appendix the findings are confirmed statistically by Dr. Major Greenwood and Miss G. M. Newbold, who say:

"*Weight.*—On the whole the milk and butter groups both show definite excess increases in weight over the basic group, and of about the same order, but slightly higher for the milk group. Summer shows a definite increase over winter; this is greater in the milk and butter groups than in the basic, and is of about the same order (slightly less) as that of the milk and butter over the basic group.

"*Height.*—On the whole the milk group shows a definite excess growth in height over the basic, and very slightly greater in summer than in winter. The excess growth of the butter group over the basic is not significant, and is only about one-third that of the milk group. Summer growth shows a definite increase over winter, very little lower than that of the milk group over the basic, and on the whole greater in the milk group than in the butter or basic."

OPERATIONS FOR CANCER.

WE announced a fortnight ago that the Ministry of Health has issued two reports on cancer—the one (No. 33) by Dr. Major Greenwood, on the natural duration of cancer, and the other (No. 34), on the late results of operation for cancer of the breast.[1]

LATE RESULTS OF OPERATION FOR CANCER OF THE BREAST.

The report on the late results of operation for cancer of the breast is based on 357 cases in which operations for cancer of the breast were performed in Leeds at the General Infirmary and the Hospital for Women and Children, during the years 1910-13 and 1919-21. The after-histories are unusually complete, ten cases only being untraceable, and in all but a few the cause of death was accurately obtained. The diagnosis of the primary growth was in all cases confirmed by microscopical examination.

The cases are grouped, according to the stage of the disease at the time of operation, under three headings—namely, Class I, the breast alone affected; Class II, the axillary glands also implicated; and Class III, other structures involved. In some instances, naturally, it was impossible to decide into which class a case should be placed, but this has not invalidated the final results of the investigation, which was directed to three main points: (*a*) the average duration of the disease prior to operation; (*b*) the results of operation as found at three, five, and ten years afterwards; and (*c*) survivorship, or the number of cases surviving in successive years after operation, compared with survivorship in healthy persons.

A. *Average Duration of the Disease Prior to Operation.*

The average duration of the disease prior to operation is exhibited in the following two tables.

Mean Period for Alleged Duration of Five Years and Under.

	Years.	Months.	Weeks.	Days.	Cases.
Class I	—	6	3	2	82
Class II	—	9	2	0	110
Class III	1	2	2	3	91

Mean Period.

	Years.	Months.	Weeks.	Days.	Cases.
All cases	1	0	2	4	324
Under five years ...	—	8	3	4	310
Under three years	—	7	1	6	295

In a few cases the alleged duration was as much as ten, fifteen, and even twenty years, but the above calculation was restricted to five years and under, because it seemed doubtful whether the growths could have been malignant during the whole of more prolonged periods. The figures show a sensible difference in the alleged durations in the several classes, indicating, as might have been expected, a definite relationship between the duration of the tumour and the stage of the disease.

B. *The Results of Operation after Three, Five, and Ten Years.*

In tabulating the late results of operation all the cases were available for the three-year period; all except those operated upon in 1921 for the five-year period; and all the 1910-13 cases for the ten-year period. The results

[1] Ministry of Health. Reports on Public Health and Medical Subjects. No. 33: *The Natural Duration of Cancer*, by Dr. Major Greenwood; price 9d. No. 34: *The Late Results of Operation for Cancer of the Breast (Leeds)*; price 6d. H.M. Stationery Office, London, Manchester, Cardiff, and Edinburgh.

practising in the Bristol area, or, finally, through the intermediary of some benevolent society. A part of the Orthopaedic Hospital is equipped as an open-air school, and special attention is paid to the education of such patients as may suffer from some degree of mental dullness not amounting to certifiable deficiency. Children on reaching the age of 14 years have to be sent home, unless acutely ill, and the only medical care they receive after their discharge is by private medical attendance in their homes or by attending the out-patient department of the Royal Infirmary, the General Hospital, or the Royal Hospital for Women and Children. In the last named hospital about 350 out of an average annual total of 500 surgical in-patients treated are orthopaedic cases. A small proportion of children and adults are treated at the Royal Infirmary and General Hospital; adults requiring prolonged treatment have to be sent to other centres. Children suffering from tuberculous bone or joint disease who do not require operation are admissible to Frenchay, a children's sanatorium situated just outside the city, maintained by the Bristol Health Committee. Here a large number of non-surgical cases of tuberculosis are also treated. Many schemes for co-ordinating and extending orthopaedic work in Bristol have been considered. Negotiations are in progress for combining the work of the Orthopaedic Hospital and the Cripple Children's Society in some closer union than at present exists. If this is accomplished it may be possible to build a much larger hospital containing several hundred beds on a fresh site at a convenient distance outside the city. The numerous hills by which Bristol is surrounded offer almost embarrassing choice of admirable situations. The Cripple Children's Society has already collected £10,000 towards a building fund, but at least another £10,000 will be needed before any scheme can be embarked upon. It is hoped that in any new scheme the claims of cardiac cripples will be stoutly urged and favourably considered.

Port of Manchester Health Report.

The report of Dr. W. F. Dearden, M.O.H. to the Manchester Port Sanitary Authority for the year 1925, just published, contains a series of tables recording the cases of infectious diseases, notifiable to the authority, reported during the year. The total number so recorded was 139, and shows no definite prevalence of disease in Manchester-bound vessels or in the port. In the ports having communication with Manchester, however, plague and cholera are shown to have existed at Alexandria and Karachi, and there were isolated cases at several other ports, notably Roumanian ports on the Black Sea. The origin and destination of each of the 139 notifiable cases are given in detail in a table occupying a considerable section of the report. Other sections deal with rat destruction, the total number of rats obtained from ships during the year being 2,240, and from dock premises 3,116. Trapping appears to have been the chief method employed for their destruction, and in fact was the only method on ships arriving from infected ports. The remainder of the report gives the results of inspection of food imports and of the sanitary inspection of vessels. In 1925 the number of ships inspected was 2,069, of which 582, or 28.04 per cent., were found insanitary. There has been very little variation in this percentage during the last twenty years; 465 out of 1,494 British ships were insanitary, the next highest numbers being 47 out of 179 Norwegian, and 27 out of 102 United States vessels. The crews numbered 47,164, of whom 34,703 were on British, 3,386 on American, and 3,445 on Norwegian ships. Swedish and Danish ships had crews of 1,492 and 1,489 respectively, but no other nationalities had any great number of ships or crews. The crews of the British ships, it may be noted, were composed of 27,854 Europeans, 6,354 lascars, and 495 Chinese. Details are given of the sanitary defects noted, as also of the sanitary inspection of 811 boats under the Canal Boats Acts. Tables are also included showing the import and export trade of the Port of Manchester; the most interesting being a record of the live cattle trade from Canada; 21,612 were shipped, and of this number only 20 were lost at sea during the year.

The Welsh National Memorial Association.

The quarterly meeting of the council of King Edward VII Welsh National Memorial Association was held at Swansea on July 29th. The president, Mr. David Davies, M.P., who was in the chair, said that the financial position was not satisfactory; he suggested that a deputation should be appointed to wait on the Treasury and recall it to a sense of its duty to Wales, which, as compared with English counties, was not receiving a fair share of assistance. He alluded to a report presented to the council by the Medical Committee as to the Spahlinger treatment; three members of the medical staff of the association had, he said, recently visited Geneva, as arranged at the last meeting of council (British Medical Journal, May 1st, 1926, p. 802). Their report had now been presented to the Medical Committee, which recommended that for the present it should be regarded as confidential, and that three subcommittees should be appointed to consider it and conduct further investigations. These committees would be (1) clinical, (2) bacteriological, and (3) general purposes. The report led to a lively discussion, in the course of which Mr. J. Games, a member of the Monmouthshire County Council, asked for assurance from the chairman of the Medical Committee that the recommendations now submitted by that committee would not in any way thwart the wishes of the council. The chairman, Dr. Enoch Moss of Wrexham, said that there was no such intention. Dr. John Jones (Dolgelley), speaking on behalf of the Merionethshire County Council, opposed the recommendations on the ground that the ratepayers of Wales should not be put to further expense. He thought the true test was whether M. Spahlinger would supply sufficient vaccines and serums to permit of a fair trial, and moved that the council should proceed no further in the matter. The amendment was seconded, but appeals, supported by the president, were made to Dr. John Jones to withdraw it, and eventually he consented. The matter was left in the hands of the Medical Committee to take such action as it might think fit. The report of the principal medical officer stated that decidedly favourable results had followed the further trial of sanocrysin, and that the effects of light treatment at the Glan Ely Hospital had been most striking. He appealed for additional equipment, since many patients, including some thirty sufferers from lupus, were awaiting treatment. He also appealed for greater facilities for *x*-ray diagnosis and treatment for both pulmonary and surgical tuberculosis. Such installations were already at work at several of the association's hospitals, but more were needed.

The Cardigan Hospital.

The Cardigan Hospital, one of the best of cottage hospitals, owes its present state of efficiency in very large measure to the care which Sir John Lynn-Thomas, K.B.E., F.R.C.S., has given to it. When the people of the district were casting about for a suitable site for a war memorial hospital he pointed to a vacant residence just outside the town, with a garden whose containing wall skirted the foreshore of the river Teifi. It was bought and remodelled internally, and now a flat roof for sun treatment has been formed. Last week Dame Margaret Lloyd George visited the hospital and opened a new electric lift to this flat roof. In doing so she mentioned that when she first visited the hospital it had only six beds; now it had fifteen, which was evidence that the institution was meeting a want. On the same occasion the Vale of Teifi Medical Society, through Dr. T. J. Jenkins, its honorary secretary, presented to the hospital a portrait of Sir John Lynn-Thomas painted by Mr. E. T. Copnall of Liverpool. The portrait was unveiled by the Earl of Lisburne, Lord Lieutenant of Cardiganshire and president of the Cardigan Society in London.

Pension Scheme for Hospital Officers and Nurses.

Considerable progress has now been made with the plan for a general contributory system of pensions for hospital officers and nurses in London institutions, on the lines of a memorandum issued towards the end of 1924 by a conference of representatives of King Edward's Hospital

in respect of fees payable to medical practitioners who may be called in by midwives.

The Central Midwives Board is to divide the roll of midwives into two parts—one, of practising midwives, to be published yearly, and the other at not more than five-yearly intervals. The Board is empowered to make rules as to the wearing of badges by certified midwives.

Maternity Homes.

Part II of the Act deals with the registration of maternity homes. After January 1st, 1927, any person carrying on an unlicensed maternity home will be liable to a fine up to £50, or, for a second offence, to three months' imprisonment. "Maternity home" is defined as any premises used, or intended to be used, for the reception of pregnant women or of women immediately after childbirth, but does not include any hospital or other premises maintained or controlled by a Government department or local authority, or by any body constituted by special Act of Parliament or incorporated by Royal Charter. A local supervising authority may grant exemption from registration in respect of any hospital or other premises for the conduct of which a duly qualified medical practitioner resident therein is responsible, or any hospital or institution not carried on for profit and not used mainly as a maternity home. A local supervising authority may at any time withdraw such an exemption. The local authority may refuse to register an application if the applicant or any employee is not a fit person to carry on or to be employed at a maternity home, or if the premises are unfit, or are used for improper or undesirable purposes. It is not now necessary to obtain a licence for the establishment of a lying-in hospital in accordance with the provisions of the Lying-in Hospitals Act, 1773. The new Act does not affect the provisions of local Acts already giving municipalities power over maternity homes. Opportunity is given for appeals against a refusal to license. Authorized inspectors may at all reasonable times enter homes which they have fit cause to believe are used as maternity homes. The certificate of registration must be displayed conspicuously in each home, and the local supervising authority may make by-laws with regard to the records of patients received, children born, and of children removed otherwise than to the custody of parent, guardian, or relative. By-laws may also be made about the notification of any death in a maternity home and of its cause.

The local supervising authority remains as under the previous Midwives Act.

England and Wales.

Classification of Feeble-minded Offenders.

The Mental Hospitals Committee of the London County Council has raised objections to certain wider definitions of mental defect recommended by the departmental committee appointed by the Home Secretary in 1924 to consider the question of sexual offences against young persons.[1] The effect of these definitions, in the Mental Hospitals Committee's opinion, would be to make it unnecessary, in order to find defect within the meaning of the Mental Deficiency Act, to prove more than an existing condition of mental enfeeblement In this way every case of mental degeneration in which the conduct showed the need for care, supervision, and control would be brought, along with every case of congenital defect, within the scope of the Act. The Lunacy Acts and the Mental Deficiency Act would in that event overlap, for in practice it would be found that under both Acts the real standard for decision would be whether a person acted with reasonable regard to his environment. The question of whether a given case should be dealt with as one of lunacy or of mental defect would probably resolve itself into one of institutional accommodation. This, in the view of the Mental Hospitals Committee, is not desirable, nor is it desirable to run the risk of getting together into one institution cases of definite mental degeneration or disease and cases of congenital mental insufficiency. The committee believes that the Government desires the definitions of defect in the Mental Deficiency Act to be somewhat widened in scope by the omission of the awkward limitation imposed by the words "birth or early age," and the substitution of some form of words which would suggest arrest of development. The committee would not object to this, but it believes that the real motive behind the desire for the speedy amendment of the definitions in the Act is to enable more cases suffering from the sequelae of encephalitis lethargica to be dealt with in institutions under the Mental Deficiency Act. This might have some advantages, but it would also give rise to difficulties. The committee raises no objection to another recommendation of the departmental committee, that after the conviction of a person, but before sentence, the bench shall remand for medical examination and report cases in which mental disease, disorder, or defect is suspected; this might add somewhat to the work of the medical officers, but not greatly. With regard to the recommendation that all courts shall make arrangements for the services of a mental expert, the committee points out that so far as London is concerned the courts of criminal jurisdiction have an arrangement similar to that which the departmental committee proposes. If an offender appears to be mentally defective one of the Council's certifying medical officers examines him, and should the case prove to be one of defect the Council advises the court as to the institution to which the case might be sent. The committee suggests that this arrangement works better than would one whereby the courts were advised by a specially appointed mental expert, whose judgement might not coincide with that of the Council's advisers, and who could not in any event give the court information as to what the Council was prepared to do with the case. Another recommendation of the departmental committee, for the prolonged detention of habitual offenders, raises a matter of principle. The Mental Hospitals Committee thinks that if there are numbers of defectives who are habitual practitioners of public indecency, and not merely a few who attract attention because of the flagrancy of the offence, it would be better to get special legislation providing for their indeterminate detention than to extend the scope of the Mental Deficiency Act.

[1] BRITISH MEDICAL JOURNAL, January 16th, 1926, p. 112.

Cancer Campaign in Yorkshire.

At a meeting of the Yorkshire Council of the British Empire Cancer Campaign, on July 26th, at Leeds, under the presidency of Sir Berkeley Moynihan, it was announced that £100,520 had already been raised in the county. Arrangements were being made for dietetic research in relation to cancer to be conducted at the University of Sheffield, under the direction of Professor Mellanby, at an estimated cost of about £10,000, for which the council would be responsible. Professor Jamieson, reporting on the progress in the development of the Research Laboratory in Leeds, said that two houses and shops, formerly occupied by the Leeds Tuberculosis Committee, had been acquired on a five years' lease, and would be converted for use as a temporary research laboratory, which it was hoped would be able to start work on October 1st. The sum of £1,000 was voted for the equipment of this laboratory, which will be replaced eventually by a new building, towards which Sir Algernon Firth has given £20,000. In the districts of Halifax, Huddersfield, and Keighley the appeal is about to be closed; in each case at least three times the money originally asked for has been received. The inaugural meetings of the Campaign in Hull and Rotherham were very successful, and a substantial increase to the fund appears to be probable, though the continued coal strike has seriously hampered the appeal in some towns in Yorkshire.

Bristol Crippled Children.

Crippled children in the city of Bristol are looked after mainly by the Orthopaedic Hospital, the Royal Hospital for Women and Children, and by the Bristol Cripple Children's Society. This society is a purely local organization founded four years ago for the care of crippled children of all descriptions. It arranges for the admission of patients to an orthopaedic hospital in Bristol or elsewhere, pays all hospital and convalescent home fees, and provides any necessary appliances. The society also does much valuable after-care work. The Bristol Orthopaedic Hospital and Home for Crippled Children is a considerably older institution; it contains forty beds for children whose ages range from 3 weeks to 14 years. It is situated on high ground close to the Durdham Downs, about one mile from the centre of the city. A large proportion of its patients are tuberculous. It has no out-patient department, but patients are admitted either from the Royal Infirmary, the General Hospital, or by direct recommendation of doctors

and submits a précis to the Secretary, Committee on Milk Supply, Department of Local Government and Public Health, Upper Merrion Street, Dublin.

HEALTH OF A NORTH OF IRELAND SEAPORT.

Coleraine, a small seaport of some seven thousand people on the north-east coast of Londonderry, was recently visited by Dr. Patrick, one of the medical inspectors of the Ministry for Home Affairs of Northern Ireland, who found the general sanitary conditions satisfactory, but recommended that one of the slaughterhouses should be closed. He recommended further that a public abattoir should be established, and the meat supply systematically inspected. The condition of the cowsheds was, on the whole, fair, but the Ministry recommends that samples of the milk sold in the district should be submitted from time to time to bacteriological examination. Some of the houses are of a poor type in the urban district, but the council is considering the building of new houses. The maternity and child welfare scheme was working satisfactorily, but there had been some difficulty about the water supply. It was sufficient in quantity, being equivalent to 35 gallons a head of the population, but when the higher levels were being supplied the water had to be turned off in other parts—a dangerous state of things. Sanitation generally had improved, and there was not the same amount of promiscuous dumping of house refuse and rubbish on waste ground; but there were still heaps of manure which should be removed at least once a week, and the cleansing of ashpits, which should be covered, should be insisted on at frequent intervals. The fever hospital accommodation was not up to date.

Correspondence.

MINER'S NYSTAGMUS.

SIR,—Dr. A. S. Percival, when discussing the relationship of miner's nystagmus to illumination (BRITISH MEDICAL JOURNAL, July 31st, p. 224), states that the new cases of nystagmus, 163 in number, which were observed in certain pits in Northumberland and Durham in 1932 were by no means evenly distributed among the underground workers, for the coal hewers showed an incidence of 0.90 per cent., and the other underground workers one of 0.24 per cent., or about a fourth as much. Again, in one pit where electric safety lamps were used exclusively nearly 4.3 per cent. of the hewers acquired the disease, but only 1.3 per cent. of the non-hewers. In a second pit where at one time (twenty-five years ago) electric lamps were used exclusively the percentage of cases of nystagmus was notoriously high, but on replacing these lamps with safety oil lamps the number of cases among the non-hewers fell to zero, while there were very few among the hewers. Dr. Percival considers that this evidence definitely confutes the conclusion of the Miners' Nystagmus Committee to the effect that "the essential factor in the production of miners' nystagmus is deficient illumination."

Dr. Percival's conclusion does not by any means follow from the facts stated, for he has omitted to take several important factors into consideration. The coal hewers suffer more eye-strain than most other underground workers for two reasons. First, they have a greater need of accurate vision, and especially so when they are setting the props which keep the roof from falling. To do this job properly they have to fix the props and wedges in position by accurately placed blows with a hammer. Then again it is desirable for the hewers to see the coal face clearly, so that they may strike with the pick to the best advantage. Further, the hewers do not get such a good light as the other underground workers. The air around them is frequently thick with coal dust, and though I have not made any measurements I should think that this dust often reduces the effective illumination of the coal face by a half. In the airways of the mine, however, where most of the other underground men are working, there is very little suspended coal dust. Moreover, some of these airways are stone dusted, and this greatly increases the proportion of light reflected from the surface, as compared with that from the coal face.

Dr. Percival's argument that electric lamps, though more powerful than safety oil lamps, have a greater nystagmus effect, is a doubtful one. The Miners' Nystagmus Committee found that the safety oil lamps tested by them had an average luminous intensity of 0.54 candle, whilst the electric lamps had one of 0.665 candle, or 23 per cent. more; but these observations were made with the flame or filament of the lamp in the broadside-on position. According to my own observations, these values, if converted into terms of the mean all-round luminous intensity of the lamps, would fall to 0.516 candle for oil lamps and to 0.515 candle for electric lamps; that is to say, they would show no difference in favour of the electric lamp. It should be pointed out, however, that the lamps were tested at the surface of the pit and not at the coal face, where the oil lamp may lose much of its luminous intensity owing to deficient oxygen. In any case, the present-day electric lamp is not a great improvement on the present-day oil lamp, and the electric lamp of twenty-five years ago, which is referred to by Dr. Percival, may have been worse than the oil lamp which was used subsequently.

On the other hand, the electric lamp has one defect which may be of great importance in the causation of miner's nystagmus, though direct evidence is lacking. The lamp causes a pronounced glare effect, owing to its white-hot filament, whereas the oil lamp flame is soft and pleasant to the eye. The glare causes discomfort and even pain when the lamp is viewed by the dark-adapted eye, and it is noticeable that the coal hewer, when shifting his lamp from place to place, as he has to do at frequent intervals, does not look at it directly if he can avoid doing so. Mr. S. Adams, Mr. T. Bedford, and I found that the pain caused by looking at an electric lamp (fixed two feet from the eyes) for two seconds, continued to increase for the first three hours we were underground, owing to increasing dark-adaptation. The viewing causes pronounced after-images, persisting for one or two minutes, and these images are strong enough to diminish appreciably one's accuracy of aim—for example, when attempting to prick small white spots on a black background. Fortunately the glare effect of electric lamps can easily be reduced by frosting the lamp glasses, though this remedy has not yet come into general use.—I am, etc.,

Oxford, July 31st. H. M. VERNON.

ORAL ADMINISTRATION OF PANCREATIC PREPARATIONS IN THE TREATMENT OF DIABETES.

SIR,—We do not share the optimism displayed so prominently among your advertisements by the makers of "trypsogen" and other similar products regarding the value of such preparations in the treatment of diabetes. From close and fully controlled observations on patients we have never found any preparation of pancreas taken by mouth to be of the slightest value in the treatment of diabetes. We would welcome concrete proof that some useful mouth preparation really exists, because oral administration of tablets is obviously preferable to injections of insulin and the tedious necessity of dieting. But until we are convinced, by the results of detailed experiments in which the diet and other factors are fully controlled, that any such exist, we feel bound to affirm that such preparations are utterly useless. In such a disease as diabetes, in which the results of treatment can be controlled and estimated with something approaching the accuracy of pure mathematics, definite proof can be obtained.

We are not prepared to accept optimistic reports of their therapeutic value unless such reports are based on carefully controlled work. Patients usually commence a restricted diet at the same time as they begin to take these preparations, and, in our opinion, the benefit is derived entirely from the dietetic change. The fact that the patient has to swallow some half-dozen pills at the end of his meal also tends to make him careful in what he eats, and may contribute largely to the apparently happy action of these pills in some cases.

We therefore feel justified in asking space to warn the profession against undue optimism over such preparations. It is not conducive to silence to have seen patients grow

Fund for London, the British Hospitals Association, the Incorporated Association of Hospital Officers, and the College of Nursing (JOURNAL, December 19th, 1925, p. 1195). In April the King's Fund invited all the London hospitals to send representatives to a conference at the Mansion House. This conference, which was held on May 19th, was attended by representatives of 89 out of the 136 hospitals on the books of the King's Fund. A memorandum was subsequently drawn up outlining the scheme as approved by the King's Fund for the purpose of special grants-in-aid, and was sent to the hospitals represented at the conference, together with an invitation to a further meeting to decide the preliminary steps. This meeting was held in the House of Lords on July 5th, and was attended by representatives of sixty-two hospitals and of the societies concerned. A provisional council was then formed, including one representative of each participating hospital, two representatives of the Hospital Officers' Association, and two of the College of Nursing. A provisional executive committee to work out the details was constituted as follows: five representatives of participating hospitals with medical schools, five from other participating hospitals, one nominated by the Hospital Officers' Association, and one appointed by the College of Nursing. Hospitals are now invited to submit to this executive committee any point of detail on which they may desire information or decisions. Such questions should be sent to the committee, care of King Edward's Hospital Fund, 7, Walbrook, E.C.4, not later than November 1st. Any hospital which desires to participate and to send a representative to the next meeting of the provisional council is requested to notify the executive committee not later than November 15th. Particulars of the scheme in its present form are embodied in papers entitled *Outline of Scheme as approved by the King's Fund*, and *Steps taken to start the Scheme*, obtainable from the printer, George Barber, 23, Furnival Street, E.C.4, price 6d. each net, post free.

Scotland.

TYPHUS FEVER IN GLASGOW.

A MAN was removed from one of the Glasgow infirmaries to Belvedere Infectious Diseases Hospital on July 30th, suffering from typhus fever. The patient resided in Govan. An inquiry among his family for contacts led to the removal to hospital of a brother and sister who had been taken ill one day and two days previously; another sister became ill on the following day, and a married sister living at some distance was also found to be ill, and was admitted to hospital. Two days later a fourth sister, who is a maid on the staff of a large institution, also sickened, and was likewise transferred to hospital. All these cases are definitely diagnosed as typhus fever. The contacts were removed to a reception house, and on August 2nd one of these persons also developed typhus fever and was removed to hospital. No definite conclusion has been reached as to the source of infection of this group of cases, for the last recorded case of typhus fever in Glasgow was in January, 1923.

NEW GLASGOW EAR HOSPITAL.

A want has been felt in Glasgow for facilities to deal with diseases of the ear, nose, and throat. There are large special departments in the three infirmaries of the city, but the special hospital was a very small institution. On August 6th the Right Hon. Neville Chamberlain, M.P., Minister of Health, opened the new Glasgow Ear, Nose, and Throat Hospital, a large three-story building, which has just been completed in St. Vincent Street. It contains facilities and modern apparatus for a large out-patient department, and has six wards, containing 48 beds. The hospital also includes an out-patient operating theatre on the ground floor, with well equipped anaesthetic and recovery rooms, and an in-patient operating theatre on the first floor. There are also a large *x*-ray room, diathermy apparatus, and a laboratory to provide for research work being done in the hospital. The ceremony was brief owing to the fact that the hospital is now in full operation. After the opening a luncheon was held at the Royal Scottish Automobile Club. Mr. Chamberlain said that the building which he had just opened was a magnificent example of what could be achieved by the voluntary system of the British hospitals. This hospital had begun its career of usefulness fifty-four years ago in a very small way. Under the leadership of Lord Weir, the committee had succeeded in raising no less than £60,000, and to-day the new hospital started upon its career free of debt. This was a great demonstration of the energy, public spirit, and generosity of the Glasgow citizens. Mr. Chamberlain then went on to discuss the future of voluntary hospitals. His remarks are reported elsewhere (p. 313).

THE ROYAL ASYLUM, PERTH.

The ninety-ninth annual report of James Murray's Royal Asylum, Perth, records the number of admissions for the year ended March 31st, 1926, as 84, the largest number in any year of its history; 59.5 per cent. of the total admissions were on a voluntary basis. During the year 14 patients died, of whom 7 were voluntary boarders. Problems arising in the treatment of mental cases are discussed by Dr. W. D. Chambers, the medical superintendent. Rest in bed in the open air, combined with the process of "insolation," a strictly regulated exposure of increasing areas of the body to the direct rays of the sun, and the use of the ultra-violet rays produced by a mercury vapour lamp, have yielded good results. In addition to these general measures, foci of infection are sought for and eradicated. Psychotherapy is in constant use, and is considered to be of great service, and the only line of treatment yielding good results in treating the psychoneuroses.

CENTRAL MIDWIVES BOARD FOR SCOTLAND.

The examination of the Board, held simultaneously in Edinburgh, Glasgow, Dundee, and Aberdeen, has just been concluded with the following results: Out of 142 candidates who appeared for the examination 127 passed. Of the successful candidates, 32 were trained at the Royal Maternity Hospital, Edinburgh, 26 at the Royal Maternity Hospital, Glasgow, 7 at the Maternity Hospital, Aberdeen, 9 at the Maternity Hospital, Dundee, 14 at the Queen Victoria Jubilee Institute, Edinburgh, and the remainder at various other recognized institutions.

Ireland.

MEDICAL REGISTRATION (IRISH FREE STATE).

THE Free State Medical Act was to expire this month, but as a decision on the medical registration question has not yet been reached the power conferred by it to maintain the existing registration machinery in operation from month to month has been taken advantage of, and the Executive Council has made the first continuance order under the Act, extending the period for which the Act is to remain in force until September 21st next.

MILK SUPPLY IN THE FREE STATE.

The committee appointed by the Minister for Local Government and Public Health to inquire into the conditions of milk production in the Free State consists of Mr. R. Wilson, T.D. (chairman), Dr. T. Hennessy, F.R.C.S.I., T.D., Mr. P. K. Hogan, T.D., Sir William J. Thompson, M.D., Dr. E. F. Stephenson (Ministry of Local Government and Public Health), Dr. M. J. Russell, F.R.C.S.I. (Medical Officer of Health, Dublin), Messrs. P. F. Dolan, M.R.C.V.S., J. Johnson, P. O'Connor, and L. S. Smyth, and has held its first meeting, when it was decided to invite evidence, at the outset, from the Dublin Corporation, from organizations connected with the Dublin milk supply, from the Irish Agricultural Organization Society, the Irish Farmers' Union, the Creamery Managers' Association, and from inspectors of the Local Government Department. The committee will be prepared to hear any person who notifies his readiness to give evidence

the prostate. He says it never leads to subsequent contraction, but "never" is a very wide term.

I certainly should not have operated had dilatation been effectual. In these cases it is sometimes impossible to find an opening at all, and frequently difficult to get a fine bougie through. I can imagine using a Kollmann's dilator once, but cannot see the patient returning for a repetition of the process.

I tried to emphasize the importance of early catheterization. Routine packing of the prostatic cavity for forty-eight hours after the operation would involve quite unnecessary discomfort, pain, and danger for the patient, and could not have any good effect on the condition to which I refer in my article.—I am, etc.,

London, W.1, Aug. 7th. W. K. IRWIN.

MIDDLE-EAR DEAFNESS.

SIR,—We are indebted to Mr. Barnett for pointing out (July 31st, p. 227) the mistakes in the synopsis of our paper on the effects of radium treatment in chronic non-suppurative middle-ear disease, with resulting deafness, as published in the BRITISH MEDICAL JOURNAL of June 26th (p. 1087).

Both these errors were made only in this summary, and neither was made in the communication itself as read before the Surgical Section of the Royal Academy of Medicine in Ireland on May 21st, 1926.

In reading the paper we quoted Sir William Milligan's opening remarks, and also gave the views of later speakers at the meeting of the Section of Otology of the British Medical Association conference at Bath last year. We did not state that treatment was universally admitted to be most unsatisfactory. We also gave due credit to the fact that oto-sclerosis was specifically excluded from the discussion on this occasion.—We are, etc.,

W. C. STEVENSON.
Dublin, Aug. 4th. T. G. WILSON.

Obituary.

AFTER some months of illness Dr. HERBERT EDMONDSON, of Burnley, died at his residence on July 13th, at the age of 50. He was educated at Repton, Cambridge, and the London Hospital, graduating M.B., B.Ch. in 1901. He became widely known in East Lancashire as an ophthalmic surgeon, and had been in practice in Burnley for about twenty-five years. Dr. Edmondson was honorary ophthalmic and aural surgeon at the Burnley Victoria Hospital for over twenty years, and also held the appointments of ophthalmic surgeon to the Burnley Miners' Relief Society, and honorary ophthalmic surgeon to the Accrington Blind Society. He was an active and enthusiastic member of the British Medical Association, and for several years was on the executive committee of the Burnley Division, of which he was chairman in 1922-23. He leaves a widow and one son.

Dr. EDGAR WILLIAM SEYMOUR (formerly Hoffmeister), who died at Cowes, Isle of Wight, on July 25th, aged 58, was the son of the late Dr. William Hoffmeister, M.V.O., whom he succeeded as Surgeon Apothecary to Queen Victoria and the Royal Family in the Isle of Wight. Dr. Seymour received his medical education at Cambridge and St. Bartholomew's Hospital; he graduated M.B., B.Ch. in 1893, and obtained the diplomas M.R.C.S., L.R.C.P. in the same year. He was surgeon-in-ordinary to Princess Beatrice, surgeon to the Royal Yacht Squadron, and was at one time consulting physician and medical officer to the Osborne House Officers' Convalescent Home. He was made a Member of the Victorian Order in 1912. He took an active interest in cricket and had been a member of the Cambridge and Hampshire elevens. He was for some time honorary secretary of the Cowes Golf Club. Dr. Seymour retired from general practice some years ago, and leaves a widow, but no children.

The Services.

MEMORIAL TO SIR HARRY THOMPSON.

A STAINED glass window, erected in the chapel of the Queen Alexandra Military Hospital, Millbank, in memory of the late Major-General Sir Harry Thompson, A.M.S., who died in 1925, was unveiled, on August 4th, by Lieut.-General Sir Matthew Fell, Director-General of the Army Medical Service. In the course of the ceremony, Sir Matthew Fell referred to an incident at Lucknow, in 1890, when Sir Harry Thompson, regardless of his own personal safety and comfort, nursed a camp full of men suffering from cholera. The window, which is next to one shortly to be unveiled to the founder of the hospital, Queen Alexandra, contains two subjects: "The Healing of Bartimaeus" and "The Raising of the Widow's Son at Nain"; it bears the inscription "In loving memory of Major-General Sir Harry N. Thompson, K.C.M.G., C.B., D.S.O."

Universities and Colleges.

UNIVERSITY OF LONDON.

AT the meeting of the Senate held on July 21st the following were recognized as teachers of the University in the subjects indicated:

St. Thomas's Hospital Medical School.—Dr. A. St.G. J. McC. Huggett (physiology).

Guy's Hospital Medical School.—Dr. R. D. Gillespie (psychological medicine).

Bedford College.—Mrs. Nora Edkins (physiology).

The resignation of Dr. Major Greenwood from the University Readership in Medical Statistics at University College was accepted as from July 31st. It was resolved to institute a Readership in Medical Statistics at University College.

A grant of £20 has been made to Dr. K. N. G. Bailey from the Thomas Smythe Hughes Fund towards the cost of an investigation of certain strains of the *Bacillus coli* having haemolytic properties, to determine whether this property is peculiar to these strains or not, and whether this haemolytic action by the bacillus is of pathogenic importance in certain conditions of the intestinal and urinary tracts.

The Senate adopted the following resolution:

That the Co-ordination and Developments Committee be authorized to take immediate steps to secure for the University the longest possible continuance of the temporary occupation of the Malet Street site, on the understanding that the Senate will be prepared to continue negotiations for the acquisition of so much of the Bloomsbury site as is practicable, having regard to the urgent importance of increased accommodation for the University at South Kensington.

NATIONAL UNIVERSITY OF IRELAND.

THE *Calendar*[1] for 1926 of the National University of Ireland has recently been issued. It contains an account of the establishment and constitution of the University, together with a description of its general organization. Details are given of the regulations of the University and its constituent colleges, together with lists of the successful candidates at the examinations in 1925. Full information about the travelling studentships in connexion with the University and the various examinations is included.

CONJOINT BOARD IN SCOTLAND.

THE following candidates have been approved at the examination indicated:

FINAL EXAMINATION.—(*Medicine*): O. D. Beetham, B. S. Ellis, A. E. F. L. Forbes, W. L. G. Jewitt, H. S. Kent, P. R. C. Peterson, K. M. R. Swami. (*Surgery*): Elizabeth Bell, N. M. Eadie, B. S. Ellis, A. E. F. L. Forbes, J. Hendry, S. A. B. Hosang, H. B. Martin, J. V. O'K. Murphy, A. S Pool, D. B. J. de Sila, Rosie Swamikan. (*Midwifery*): A. S. Arora, S. E. W. Boland, N. M. Eadie, S. P. B. Gunawardena, O. Ap V. J nes, G. M. Macintyre, J. A. Mains, H. B. Martin, P. R. C. Peterson, D. B. J. de Silva, Rosie Swamikan. (*Medical Jurisprudence and Public Health*): J. R. J. Cameron, A. G. Couster, J. J. Craig, S. W. Cruickshank, L. M. Davies, E. A. Downes, F. H. Emery, M. Klar, Alice Law, P. M'K. Logan, A. C. Lovett-Campbell, J. W. A. M. M'Guinness, N. Macleod, G. W. Milledge, V. Nath, W. T. A. Pearce, G. D. Roche, J. J. S. F. e Souza, E. E. M. Steen, E. M. Stone.

The following, having passed the final examination, have been admitted L.R.C.P.Ed., L.R.C.S.Ed., and L.R.F.P.S.Glasg.:

Gwendoline R. Andrews, W. B. Anderson, M. M. Bronstein, Ann J. Brown, G. V. Boyle, S. N. Catterjee, L. Checchi, C. S. Chew, Mary D. Clark, J. Cook, A. H. Edgar, H. J. Fernando, M. T. Fernando, E. Fischbacher, C. A. S. Hamilton, P. Henry, S. A. Hunt, J. B. Hutchison, S. John, J. E. Kennedy, J. A. Lavery, H. Lwow, M. M. Macintyre, Jemima M. M'Kendrick, J. Margolyes, A. Maxton, P. Mehta, E. A. Menon, K. P. Menon, J. Mindess, Emma C. M. Muschamp, J. R. R. Nicholas, T. M. Ormiston, G. R. P. Parasuram, R. K. Ram, W. Read, W. Robinson, P. D. Samarasinghe, V. D. Seevaretnam, R. V. N. Selvadurai, F. T. Shadforth, D. S. de Simon, J. A. Siriwardene, J. B. Stromier, J. T. M. Symington, C. E. Toh, E. P. Tulloh, D. R. Wark, C. H. Wickremesinghe, N. Wijeyesekera.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.

THE College will close for the long vacation on August 14th, and reopen on Monday, September 20th.

[1] *The National University of Ireland: Calendar for the Year 1926.* Dublin: Alex. Thom and Co., Ltd. 1926. (4½ × 7½.)

steadily worse in spite of the prolonged use of such preparations, and to have had to rescue them from a miserable death by the use of insulin.—We are, etc.,

H. MACLEAN.
R. D. LAWRENCE.

London, W., July 29th.

THE PROPHYLACTIC VALUE OF SCARLET FEVER ANTITOXIN.

SIR,—Dr. J. H. Garrett's reply in your issue of July 31st at least serves to make clearer to me what our difference is. He is not satisfied that the Dick test is a reliable index of susceptibility or otherwise to scarlet fever; whereas we, after a daily experience of the test for the past two years, believe it to be so.

Working in conjunction with two groups of bacteriologists of repute, and with toxins produced independently by them, our aggregate of Dick tests approaches 3,000. We believe as a result of our experience, which is daily being enlarged, that an individual who gives a negative response to an adequate skin dose of Dick toxin is immune to scarlet fever—by which we mean the toxaemic manifestations produced by the *Streptococcus scarlatinae*. We know, for example, that cases sent in with a diagnosis of scarlet fever but who present no signs or symptoms of the disease, or who are palpably suffering from something else, may be safely nursed in a scarlet fever ward (*a*) if they are primarily Dick-negative, or (*b*) rendered Dick-negative by a prophylactic dose of scarlet fever antitoxin. In the latter case they remain immune for a matter of days only, and then again become Dick-positive and susceptible. Whether they are Dick-negative on admission or the condition is produced artificially, the presence of scarlet fever antitoxin can be demonstrated in their blood; their own serum in either case will produce local blanching when injected intradermally in a dose of 0.2 c.cm. into a recent scarlet fever rash—the well known Schultz-Charlton reaction.

For the moment I must ask Dr. Garrett to accept this brief statement. Some of our work on the Dick test has already been published (*Public Health*, May, 1926); a more extended series of observations is at present being prepared for publication.

Nobody realizes better than ourselves that there are difficulties and things not as yet satisfactorily explained; but the broad facts outlined above stand out. May I reiterate that a skin test dose of Dick toxin was the criterion adopted in the paper which Dr. Garrett criticizes? These readings might, indeed, have been carried out on any series of individuals with, *mutatis mutandis*, the same results: so many susceptible to a skin test dose of toxin; so many rendered temporarily immune, as shown by a negative test after administration of serum; so many, again, showing waning or complete loss of immunity—for example, the Dick test again becomes positive—after a lapse of days. As a fact, the occurrence of an initial case of scarlet fever in the ward formed a mere *point d'appui*.

The assumption with which Dr. Garrett credits me that 100 per cent. of susceptibles would necessarily contract scarlet fever is one which it would never occur to me to make. Neither did I quote Dr. Kirkhope's paper "to buttress my position," but only to draw attention to an independent series of observations under different conditions and with another criterion of susceptibility.

With a further assurance to Dr. Garrett that I write only of what I know from very careful and repeated observations, I must take my leave of him in your columns.—I am, etc.,

E. H. R. HARRIES.

Birmingham, Aug. 2nd.

DEFENCE OF ASSISTANTS AND LOCUMTENENTS.

SIR,—The letter in your issue of July 31st from the secretaries of two of the defence societies (Medical Defence Union and London and Counties Medical Protection Society) records a reciprocal arrangement which is both welcome and obvious common sense. Might I ask why the Medical and Dental Defence Union of Scotland—to which a large number of doctors belong—is not included in such an agreement? Until all such societies are linked up by reciprocal agreements, doctors cannot be adequately protected.

The importance of medical defence to the individual cannot be overestimated, as no doctor can foresee when his services may be called in question. The letter referred to deals with the specified condition that all the parties concerned belong to one or other of the two defence societies mentioned. It would have been valuable had they in addition warned those who are anxious to be protected of some of the existing weak spots in their armour.

Assistants.—A member of either of these societies is not protected against an action arising from the acts or omissions of an assistant who is not also a member of one or other of them, nor is he protected, unless a reciprocal arrangement exists, if his assistant belongs to the Medical and Dental Defence Union of Scotland. Many assistants are engaged by doctors without, so far as I know, any inquiry being made on this important point.

Hospital Consultants.—It is only implied that they will defend a member if his subordinate is also a member of one or other of the two societies. No reference is made to the hospital consultant who is a member, and who is liable to legal expenses should his treatment be called in question, and whose junior (the resident responsible for the action) is not a member, which is usually the case. Consultants are all too prone to feel that the committee of management or house committee—whichever term is used—will be held solely responsible for the acts of the residents it appoints. In strict law I understand this is not the case. Sisters and nurses, of course, are not members of any defence society.

Locumtenents.—The Medical Defence Union, in the BRITISH MEDICAL JOURNAL of March 27th, stated that it will afford the usual cover to its members for the acts or omissions of "any registered medical practitioner, while temporarily employed as a locumtenent." The other defence society (the London and Counties Medical Protection Society) makes no statement on the matter. It is highly important that this point should be settled at the earliest possible date. The vast majority of locumtenents are recently qualified men who have not yet realized the risks and responsibilities of practice, but there are others who engage in locumtenent work—namely:

1. The habitual locumtenent, who may be quite a senior member of the profession.
2. The man engaged in whole-time administrative work who does a casual locumtenency.
3. The neighbouring practitioner (not a member) who looks after the practice of a friend (a member) during his absence.

One might reasonably ask for a clear definition of what constitutes a "locumtenent" and "assistantship," and is No. 3 recognized as a locumtenent? Also, When does a long locumtenency become a short assistantship?

The Medical and Dental Defence Union of Scotland, in the BRITISH MEDICAL JOURNAL of August 7th, states that its members are covered against actions arising out of the acts or omissions of their assistants or locumtenents. There are very strong reasons why the medical defence societies in these islands should have a comprehensive reciprocal arrangement, and that the protection on the matters referred to should be on a sound and clear basis.—I am, etc.,

E. FARQUHAR MURRAY, M.D., F.R.C.S.,
Honorary Secretary, Newcastle-on-Tyne Division, British Medical Association.

Newcastle-on-Tyne, Aug. 9th.

OBSTRUCTION AT THE VESICAL OUTLET AFTER PROSTATECTOMY.

SIR,—Mr. Ainsworth-Davis (July 31st, p. 226) credits me with diagnosing a fibrous type of prostatic enlargement in the three cases I recently described under the above heading, and suggests that diathermy was the proper treatment. Even had I diagnosed the exact conditions I found on operating, I should not have tried diathermy with any brand of instrument. However successful it may be in cases of an obstructing bar or membrane, it is certainly not suitable for every fibrous enlargement of

Medical News.

AT a meeting at the Post-Graduate Hostel, Imperial Hotel, Russell Square, W.C.1, on August 5th, Dr. Manson-Bahr opened a discussion on tropical diseases in London. He maintained that the clinical side of tropical medicine could be studied best outside the tropics. In the course of his remarks he referred to a drug introduced for the treatment of amoebic dysentery which had been successfully employed in ulcerative colitis. Blackwater fever—which, he said, always affected mild or latent cases of malaria—was, he thought, probably anaphylactic in nature. He praised Bayer 205, which had gone a long way in the successful treatment of sleeping sickness, and made a plea for increased help of the biochemist in the fight against tropical diseases. Lieut.-Colonel Mackie, I.M.S., who was in the chair, observed that tropical disease might be latent for many months, and agreed that the clinical side of tropical diseases was best studied in this country, where hospital and laboratory facilities were excellent.

THE Fellowship of Medicine announces that a special all-day course will be held at the Queen's Hospital for Children from August 16th to 28th. An all-day revision course in medicine, surgery, and the specialties at the Queen Mary's Hospital, Stratford, will continue from August 23rd to September 4th. Continuous weekly courses in obstetrics are given at the City of London Maternity Hospital, and the Fellowship can also provide practical courses in anaesthetics. From September 6th for four weeks special lecture demonstrations, on the more important diseases of the eye, will be arranged at the Central London Ophthalmic Hospital. From September 6th also eight bi-weekly lecture demonstrations in psychological medicine will be given at the Bethlem Royal Hospital. From September 13th to 25th the Infants Hospital will hold a course for medical officers of welfare centres and others. Between September 20th and October 1st the Westminster Hospital will provide an intensive course in medicine, surgery, and the specialties; the National Orthopaedic Hospital will hold an all-day course from September 20th to October 2nd, and on successive Wednesdays, beginning September 22nd, Dr. Heald will give four lecture demonstrations on electrotherapy. Copies of all syllabuses, the general course programme, and the Fellowship journal may be obtained from the Secretary, 1, Wimpole Street, W.1.

A THREE months' course of lectures and demonstrations in hospital administration complying with the regulations of the General Medical Council will be given by the Medical Superintendent on Monday, October 4th, at the North-Eastern Hospital of the Metropolitan Asylums Board, St. Ann's Road, Tottenham, N.15. Further particulars can be obtained from the Clerk to the Metropolitan Asylums Board, Victoria Embankment, E.C.4.

THE Lord Mayor of Liverpool (Mr. F. C. Bowring) has accepted the invitation to be chairman of the Liverpool School of Tropical Medicine in succession to the late Sir Francis Danson.

THE Rockefeller Institute has presented the Norwegian Government with a million gold crowns for a State serum and vaccine institute.

PROFESSOR CAESAR ROUX, the well known surgeon of Lausanne, and Professor G. Winter, who held the chair of obstetrics at Königsberg, have been made emeritus professors in their respective universities.

AT the recent congress held in Brussels entitled "Journées médicales de Bruxelles" papers on the following, among other subjects, were read: the antisyphilitic campaign in Belgium, by Professor A. Bayet; vaccine therapy of acute microbial affections, by Dr. Bertrand; the surgery of cerebral tumours, by Dr. de Martel; the surgery of pain, by Professor Sicard; the onset of human tuberculosis, by Professor Léon Bernard; treatment by ultra-violet rays, by Dr. Dekeyser; and radium treatment of cancer, by Dr. L. Mayer. A special excursion was made to Louvain, where the degree of doctor *honoris causa* was conferred on Marshal Lyautey by the university.

THE History of Medicine Institute at Leipzig, founded by Professor Karl Sudhoff, and now under the direction of Professor Henry E. Sigerist, in addition to a well stocked library, contains a collection of over 10,000 photographs, as well as models and instruments for teaching purposes.

THE German Röntgen Society will hold its annual meeting at Düsseldorf from September 22nd to 24th, when the following subjects will be discussed: *X*-ray treatment of inflammation, introduced by Heidenheim of Worms, Porges of Vienna, and Wagner of Prague; the Compton effect, introduced by Friedrich of Berlin; irradiation of the ovary and offspring, introduced by Martinus of Bonn and Nürnbuger of Hamburg.

THE following international post-graduate medical courses will be held in Berlin in October. From October 4th to 16th there will be a course in general medicine, with special reference to the latest progress in therapeutics, and from the 18th to the 30th a course in neurology; a fortnight's course will commence on October 18th in specialties, and a month's course on October 4th. Further information may be obtained from the secretary of the International Post-Graduate Medical Courses, Kaiserin Friedrich-Haus, Luisenplatz 2–4, Berlin, N.W.6.

THE congress known as the Journées médicales de Montpellier, organized by Professors Ducamp, Delmas, and Faucon, will be held at Montpellier from November 4th to 7th, when the centenary of the medical clinic and the discovery of bromine by the Montpellier chemist Balard will be celebrated.

THE German society for the study of diseases of digestion and metabolism will hold a congress in Berlin under the presidency of Professor von Bergmann of Frankfort from October 13th to 16th.

THE third International Congress of Individual Psychology will be held at Düsseldorf from September 26th to 29th. Further information can be obtained from Dr. Maximilian Reis, Friedenstrasse 20.1, Dortmund.

DR. H. ALDERSHOFF, director of the State Serological Institute at Utrecht, has prepared a serum from sheep immunized against vaccinia for use in cases of post-vaccinal encephalitis. The serum, which should be administered as early as possible after appearance of the symptoms, will be sent free of charge to practitioners attending a case of post-vaccinal encephalitis.

THE July issue of *Boletín Técnico de la Dirección general de Sanidad*, a bi-monthly journal recently started by the Spanish Ministry of Health, contains articles by Dr. Andrés Lopez Prior on a focus of pellagra in Caldas de Reyes, by Dr. F. Beato on the etiology of scarlet fever, and by Dr. F. F. Garcia on an official method for the examination of oysters; and statistical tables of births and deaths in the various provinces of Spain during the months of January, February, and March, as well as abstracts from current literature and medical news.

PROFESSOR ROGER has been re-elected dean of the Paris Faculty of Medicine.

Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to ***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

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QUERIES AND ANSWERS.

LEAKAGE AFTER OPERATION ON THE BLADDER.

DR. ALFRED MERRIN (Kingstown, co. Dublin) asks for help in the following case: A gentleman, aged 80, eighteen months ago was submitted to an operation for prostatectomy, but the prostate could not be removed and he was left with a suprapubic apparatus. A Jacques oesophageal tube, size 18, was threaded through a rubber brick-shaped pad with one end in the bladder and the other in a rubber bag fixed at the thigh. The pad was held in position by a broad abdominal belt. This worked well for a few months and then the fistula began to get smaller; stretching it with sinus forceps and using a smaller tube

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

ON August 4th, on the motion that the House of Commons adjourn till November 9th, Mr. Hardie remarked that after an excessively strenuous period of work it was impossible to recuperate in three months. The work of the House should be arranged so that there never would be any all-night sittings nor any attempt to crush six months' work into three months. They should organize so as to get the rest necessary for recuperation and to carry on work continuously at a high level of nervous expenditure. At present the House did not do that, and after the first three weeks of the session the occupants of the Government front bench looked as if they were going to have early funerals. They would never get health with the self-inflicted overstrenuous periods of the present system. The motion to rise till November 9th was carried.

The Factories Bill.

The Factories Bill, which was introduced into the House of Commons on August 2nd by the Home Secretary, Sir William Joynson-Hicks, closely follows, though with some omissions, the bill tabled by Mr. Arthur Henderson when Home Secretary in 1924. It is chiefly a codification of existing Factory Acts and Orders, but makes considerable changes in the law, not only in nomenclature, as when "certifying surgeons" become "appointed doctors," but in substance.

The bill abolishes the distinctions between factories and workshops and between textile and non-textile factories. Provisions relating to the sanitary conditions of workshops, to cleanliness, overcrowding, ventilation, and the drainage of floors, and to the provision of sanitary conveniences, are now enforceable in the first instance by the local sanitary authorities—with certain exceptions in the last regard. The bill proposes that they shall be enforceable by the factory inspectors save in any factory where mechanical power is not used and which forms part of a dwelling-house or shop in the same occupation. There the provisions are to be enforced by the sanitary authority, to whom the Home Secretary may also delegate similar powers over other factories not employing mechanical power. The bill expands previous legal definitions of a factory to include railway lines and sidings, premises where materials or articles are sorted as a preliminary to work in any factory, where bottles or containers are filled or articles packed, and for adapting stage properties and dresses. The application to electricity works is extended. Premises adjacent to a mine or quarry used solely for processes ancillary to the getting and preparation of minerals are not to be deemed a factory.

In the clause dealing with cleanliness in factories provision is made that the floor of each workroom must be cleaned at least once weekly. The obligation to paint or whitewash walls is extended to partitions; those with smooth, impervious surfaces must be washed with soap and water at least every fourteen months. The provisions about whitewashing or painting will not apply to factories without mechanical power and employing fewer than ten persons unless the inspector so requires.

Under the existing law, the cubic space to be allowed to each person is 250 ft. at ordinary times, and 400 ft. during overtime. The clause substitutes 400 ft. at all times for rooms not used as workrooms before the passing of the Act. It also excludes from the calculation of the cubic space, space more than 14 ft. from the floor. A new provision enjoins that where the work is chiefly done sitting the temperature shall not after the first hour fall below 60°. The Home Secretary may by special order prescribe a reasonable temperature for any class or parts of factories and prohibit means which may be injurious for maintaining temperatures. He may also prescribe a standard of lighting for factories. All windows and skylights are to be kept clean as far as practicable on both sides and free from obstructions. A new provision lays it down that "Where it appears to the Secretary of State that in view of the amount of sickness among the workers in any factory or class or description of factories or for some other reason that special provision ought to be made at that factory or at factories of that class or description to secure the health of persons employed therein, he may, after consultation with the Minister of Health, by order require the occupier to make such reasonable provision by arrangements for the special medical supervision of the workers and otherwise (but not so as to include medical treatment) as may be specified in the order."

The law relating to the fencing of machinery is extended and a new statutory provision made for fencing vessels containing scalding, corrosive, or poisonous liquids. Safeguards are made about work in places where dangerous fumes may be encountered. Suitable breathing apparatus and oxygen reviving apparatus must be provided. The provisions relating to means of escape from fire are amplified and applied to factories employing fewer than forty persons. Fire drill is ordered in some factories. The maintenance of a supply of drinking water is to be enforced, and the provision of first-aid boxes, which has been in force since 1924, is continued. Seats must be provided for female workers whose work is done standing, and protective clothing where prescribed as necessary. In making orders about welfare the Home Secretary may impose duties upon employees.

(Clauses in Mr. Henderson's bill relating to washing facilities and facilities for drying clothes are dropped from the new measure. So also is the clause prohibiting after five years the use of shuttles capable of being threaded by suction of the mouth.) The present bill extends the obligation to protect workers from dust and fumes. No meals are to be allowed in any workroom where highly siliceous dust is given off, and a penalty is provided against employees spitting where that is prohibited by notice. The age at which girls may be employed in salt works is raised to 18. In tenement factories where metals are ground the provision made by Order for a clear space between the grindstones and the wall is amended to allow the use of splashboards. Provision is made for the maintenance of wet and dry bulb thermometers in all factories where humidity is artificially produced, and a table of the permitted relation between the two readings is provided. Inspectors are given power to forbid the carrying on of certain trades in unsuitable underground rooms. These trades include the preparation of food for human consumption. No basement bakehouses are to be established after the passing of the Act. The district council is to enforce this provision. In general the Secretary of State takes power to make regulations for the safety or health of persons employed in any process without the need for a prior certificate that the process is dangerous.

To the obligation of any medical practitioner attending on a patient suffering from lead, phosphorus, arsenical, or mercurial poisoning, or anthrax, contracted in a factory, to report that illness, is now added the obligation to send the Chief Inspector of Factories the name and address of the factory. The court can order the expenses of witnesses at inquiries into factory accidents or diseases to be paid by the person held responsible in any way for the occurrence. In the next clause "appointed doctors" are substituted for "certifying surgeons," but with no change of powers. Hours of employment are made the same in textile as in non-textile factories, and the overtime regulations are altered. An extended provision enjoins that where the Home Secretary thinks a special provision requisite for the protection of the health of women or young persons employed under a special exception he can order the provision to be a condition of employment.

The bill recasts the rules for the issue by the appointed doctor of certificates of fitness for employment of young persons under the age of 16. Power is given to the Home Secretary to exempt from the section any works where mechanical power is not used. A later clause provides that the Home Secretary shall fix the fees to be paid to the appointed doctors. The fee for examination of young persons, or of other employees in pursuance of regulations, is to be paid by the occupier of the factory; in other cases by the Treasury.

The application of factory legislation to docks, wharves, quays, and warehouses is widened. Certain provisions of the bill are extended to all building works. These include those relating to sanitary conveniences. Similar extension is made to engineering works and to lines and sidings in connexion therewith. The bill is also applicable to building operations and engineering works undertaken for the Crown.

The Lead Paint Bill.

On August 3rd the House of Commons considered, on report, the Lead Paint (Protection against Poisoning) Bill. Mr. Rhys Davies moved a new clause to prohibit the use of lead paint for interior painting, with certain exceptions. He said the amendment would implement the Geneva Convention, for which the Labour party stood. Regulations somewhat similar to those which the Government proposed for painting had been introduced in 1913 for the pottery industry, but had not prevented lead poisoning, which had increased in that industry during thirteen years. Mr. Montague said medical evidence was overwhelmingly in favour of prohibition. Major Hills said that eventually lead would have to be prohibited, both in paint and in pottery glaze. Mr. Wallhead said lead poisoning induced nervous diseases, and added to the danger of Bright's disease. Dr. Watts asked if Mr. Wallhead was aware of the danger in the use of zinc. Mr. Wallhead said there was no danger when zinc was prepared as paint. Captain Hacking, for the Home Office, thought that if regulations failed to reduce the death rate from lead poisoning very largely the Home Secretary would introduce a more drastic bill with prohibition as its essence. The proposed new clause was rejected by 198 to 74. Dr. Watts moved that the medical examination of painters proposed in the bill should be made monthly. Captain Hacking offered to accept the word "periodical" instead of "monthly," and Dr. Watts withdrew his amendment, and "periodical" was inserted. The House rejected a further amendment by Dr. Watts which proposed that the examination should be by a certifying factory surgeon. Sir Robert Newman moved that the clause prohibiting the employment of women or young persons in painting buildings with lead paint should be amended by leaving out the words "women or." He asked why, if the proposed regulations were to remove the danger of lead poisoning, women could not join in the occupation as well as men. Mr. Hurst seconded, and said hundreds of women were employed in this work. Dr. Haden Guest said that the fact that lead poisoning was an important cause of abortion was a sufficient reason to protect women more than men. Captain Hacking hoped the House would not accept the amendment. Sir Thomas Oliver had said that "on the whole females suffered more severely from plumbism than males," and Sir Thomas Legge, Chief Medical Inspector of Factories at the Home Office, said "women are more susceptible to poisoning by lead than men." The amendment was rejected, and the bill was read a third time. It was read a first time by the House of Lords on August 4th.